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The Coal Pile

Development of a Serious Situation

As the largest customer of the collieries, the electricity supply industry is vitally interested in any developments in policy that may affect its ability to present the potential crude energy of the fuel in its most convenient form for use by the public. Its interest comes under two heads: One is a short-range consideration of quantity; the other raises relatively long-term questions of quality and price. It is with the first that we deal here as a matter of urgency.

Effect on Boiler Operation

Quality does, of course, enter to some extent into the immediate picture. One example is the ill results that have attended the dilution of fuel with an excessive proportion of incombustible matter and the use of fuel which, while not so lacking in burning properties, nevertheless has characteristics for which particular boiler installations were not designed. Inability of boilers to continue in service or to give their rated outputs for reasonable periods in such circumstances has been a material factor in diminishing the available generating capacity of the country and has contributed in no small degree towards the short curtailments of supply on a few occasions during the past couple of winters.

What we have in mind, however, are not temporary inconveniences of this nature, which quite possibly may recur at times of peak loads over the next two or three years, but rather the prospect of more serious, because more prolonged and widespread, interruptions of output owing to depletion of coal stocks at power stations. In other words the deficiency will be in kWh and not only in kW as hitherto. Year by year there has latterly been a progressive reduction of the fuel reserves which are essential to ensure continuity of supply.

In the past calls made upon the coal pile to even out deliveries and to cope with other emergencies in seasons of heavier load have been made good in the summer. This does not happen now, and last winter, which started with 3¼ million tons in storage, the position was precarious at a number of stations, some of which had on occasions less than a week's supply. At the moment the reserve is probably no more than a million tons and an optimistic estimate (judged from present rates of replenishment) would put the amount next October at no more than 2¼ million tons. That would be about a month's supply, but the position is a good deal worse than might appear at first glance as it is a bulk figure for the country as a whole and does not allow for considerable variations in conditions between one power station and another.

Grid System Limits

There are limits to the capacity of the grid to import energy into any area caught short of fuel and the failure of one station to maintain its output would accelerate the disappearance of already depleted stocks at other stations in the neighbourhood. Moreover the dregs of a coal pile seldom provide fuel of average calorific value, so that the tonnage assigned to it may be little more than a book-keeping

figure. Present indications are, that unless coal stocks at the power stations can be built up far more rapidly during the next few months than they have been in recent summers, reliance must once more be placed upon a "miracle," but a much bigger one than before, to avoid the serious social and industrial consequences of electricity supply failure.

Telephones

ALTHOUGH it is seventy years since the invention of the telephone (the centenary of Bell's birth falls next year), technical progress in this, the oldest, public electricity service shows no signs of coming to a halt. Indeed the extension, now in hand, of the world pioneer coaxial cable system between London and Birmingham to the main trunk network throughout the country (referred to elsewhere in this issue) represents one of the most important developments in the history of long-distance communication. In this achievement, the Post Office engineers have called in the aid of wireless technique to increase enormously the effective value of a given amount of material—quite one of the most rewarding subjects of applied research.

Nationalized Distribution

ALTHOUGH there are distinct differences in the distribution of coal and of electricity Mr. Selwyn Grant undoubtedly made a point when he said at the annual meeting of the Provincial Electric Supply Association that the Government had apparently no intention of nationalizing the distribution side of the coal industry. Mr. Grant pointed out that the number of coal distributors must run into thousands, whereas there were only some 500 electricity undertakings. He again emphasized the importance of the personal touch in the matter of electricity supply and the ability to make on-the-spot decisions which control from a remote Whitehall office or regional headquarters would render impossible.

Employees' Amenities

WHILE the removal of industries from the scope of the Essential Work Orders restores the control of their workpeople to employers and leaves employees free to change their jobs if they wish to, there is some fear among workers that their conditions will be worsened. The Orders insisted on a certain standard of welfare in factories but this, after all, was no more than enlightened employers were already observing and there should not be too much difficulty here. Nor should employers object to giving employees the right of appeal against suspension or dismissal. A knottier problem is the guaranteed working week imposed by the Orders and rightly considered by the workers to be a considerable gain. Already the continuance of the principle (for a 34-hour week) has been accepted in the engineering industry. Now the electrical cable making industry has tentatively agreed to operate a guaranteed 34-hour week.

Forced-Circulation Boilers

THE record of operation of what is stated to be the first La Mont boiler (75,000 lb per hr, 650 lb per sq in and 788 deg F) to be placed in service in this country—at a chemical works—which was given in a paper recently presented before the Institution of Mechanical Engineers, is of especially interest in that 80 per cent of the feed water had to be chemically softened. The small diameter of the tubes permissible with forced circulation, which give a small water content, prevented mechanical cleaning. Early difficulties due to fouling of heating surfaces, aggravated by the use of inferior coal, and to sludging are held by the authors, Messrs. Begg, Hebblethwaite & Cooke, to be no greater than would have been experienced with a natural-circulation boiler.

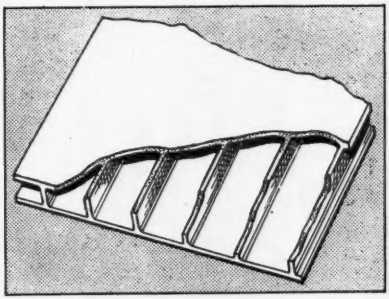
Automatic Control

DURING a recent visit to a power station with a fully automatic system of boiler control, we noticed that every selective handle on the control board was over to "hand control." At each panel we asked the reason for this, and a brief investigation revealed that some minor adjustment work going on—damper gear here, a sticky valve device there—made it necessary to go off automatic control for the time being. We do not for one moment suggest that this is a condemnation of automatic control, and we daresay it was most exceptional to have all the system components on hand control at one time. We merely pass the observation on in support of the contention that for the success of automatic control the quality of all the equipment must be of the highest order.

Plastic Board

Electrical Applications to the Manufacture of a New Product

THE attention which has been focused on the plastics industry during the past few years gives the new product, "Holoplast" board, a special interest, but it would be unfair to the makers to associate them with many of the extravagant claims which have been made in connection with plastics generally. The claims made for "Holoplast" board relate mainly to its special construction which provides parallel cavities throughout the length of the board, so that the whole constitutes a multiplicity of jointless girder sections, with all the physical advantages associated with the girder construction. The strength/weight ratio is extremely high, and the rigidity achieved by this particular construction not only favours its use for load-bearing structures like ceilings and floors, but also for non-load bearing components like walls and doors.

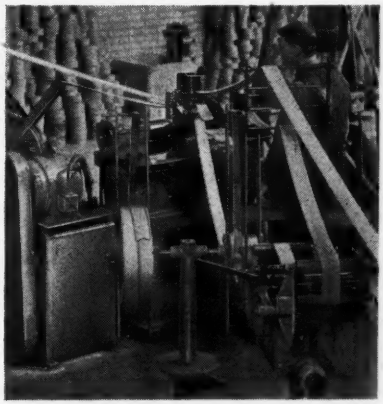


Construction of "Holoplast"

"Holoplast," which has only recently become generally known, was introduced commercially about two years ago when the makers, Holoplast, Ltd., established a factory for its production at New Hythe, Kent, under Admiralty direction, and since that time the factory has been fully employed in producing the material for equipping ships. Every conceivable use has been made of the material in the construction of interiors of the ship, and to illustrate the wider possibilities of the material it is merely necessary to draw a parallel between the inner construction of a ship and of a building. Our object in this article, however, is to depict the electrical applications to the processes in the manufacture of the new material, and we are indebted to the management of Holoplast, Ltd., for their permission to visit the works, and for their help in collecting the necessary information and in taking the photographs.

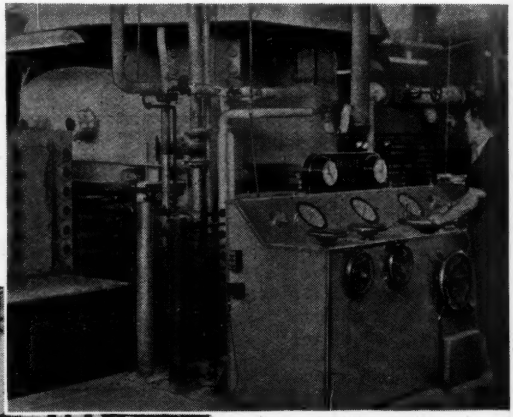
The main raw material is a special paper impregnated with phenol formaldehyde resin which is received in required sizes from the paper mill. Tubes of this paper are first constructed on a special machine on which a number of strips from the mounted paper rolls are wrapped round a non-revolving steel mandrel by a method similar in principle to that of cable insulating. As the tube is formed it is pushed along and off the mandrel by belt transmission from two vertical pulleys, the belt being turned round the horizontal tube. The pulleys are driven via vertical and bevelled gears, from an infinitely-variable-speed Crofts reducing gear which is chain driven by a 5-H.P. Brook motor. The scheme represents an overall speed reduction ratio of from 1,500 r.p.m. at the motor to 160 r.p.m. at the tube at maximum speed.

When the end of the tube reaches a point corresponding to the length of the tube required it operates a magnetic trip switch. This sets in motion a motor-driven saw which operates on the flying-shears principle and severs the tube at the required point.

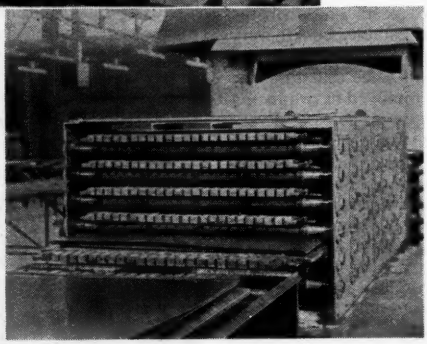


Tubes are first formed by lapping a number of strips of impregnated paper round a mandrel

There are two small motors on the saw, one serving the travelling and the other the cutting motions. The round tubes are next deformed into rectangular shape in a special deforming machine. The rectangular tubes are now ready for introduction to the assembly for making the board. Each board, when completed, measures 8 ft by 4 ft, and contains sufficient tubes to satisfy these dimensions. The two outside tubes are each filled with a wood batten, the object of which is to facilitate jointing. Incidentally, any other tube in the assembly can be similarly filled with wood to provide for cutting the board to various sizes.



The curing press is of the vertical up-stroke type ; note platens left of control station



Above: The assembly is [tightly clamped between two steel side members before the top portion is applied.

Right : Assemblies in tier formation in the charger, which is raised and lowered hydraulically

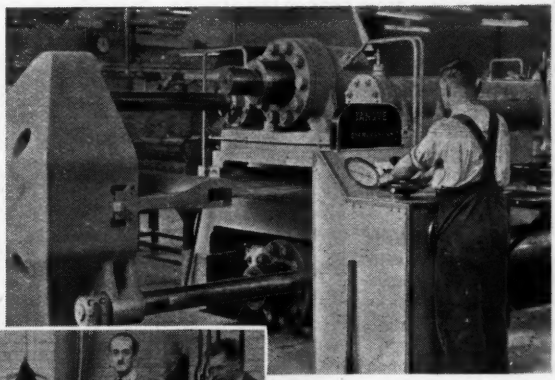
It will be appreciated that the assemblies have considerable weight, and in view of this they are built up on and transported from one machine or section to another about the works on specially constructed roller conveyors, some of which are power driven. Several assemblies at a time are received by a charger from which they are loaded into a hydraulic press. The assemblies are contained on "shelves" in tier formation in the charger, which is raised and lowered hydraulically, so that any shelf can be aligned with the roller table for loading purposes. In corresponding positions to the assemblies in the charger there are, in the press, "daylights," i.e., spaces between the platens, and all assemblies are drawn into these "daylights" from the charger when the latter is in the lower position. The platens, of course, correspond approximately in size to the sizes of the assemblies and the finished boards, and are steam heated. There are arrangements for cooling the platens by circulating water before the assemblies are withdrawn from the press.

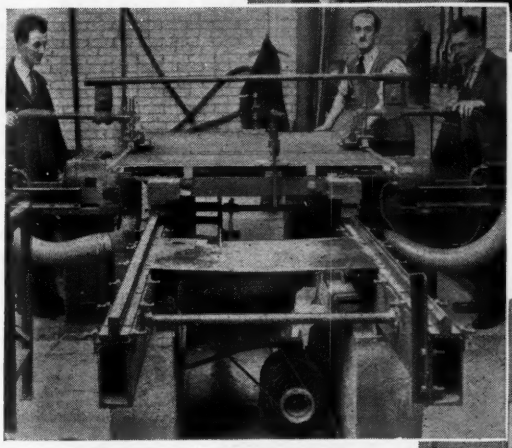
The press is a vertical up-stroke Tangye equipment which operates at 2½ tons per sq in., and it also has a side-pressure hydraulic system by which pressure is applied

to a single plate which serves all the assemblies. The various operations are controlled by means of valves which are actuated from a central control station. On the switching station there is also a push-button unit for the control of the drive on the discharger, to be referred to later, and a switching unit for indicating throughout the works that the hydraulic pressure is in use at this particular press.

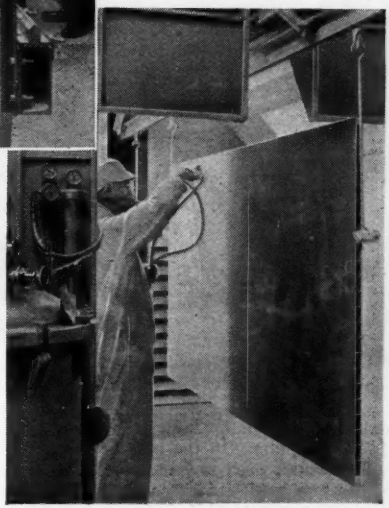
At the opposite side of the press to the charger is a discharger which is similar in most respects to the charger, including the hydraulic raising and lowering. There is in this case, however, a power-driven system by which the cured assemblies are withdrawn from the press " daylights " on to the shelves of the discharger. When this is done the assemblies in the press are linked with the assemblies in the loader, so the whole moves forward as a train. The power system in the discharger consists of a separate endless chain associated with each shelf, and to this chain is engaged a hook which also links up with the corresponding assembly being drawn from the press. The mechanism on the discharger for withdrawing the assemblies is served by a small motor which is push-button controlled from the main press control station, although there are emergency buttons on the side of the discharger.

It is now necessary to remove the mandrels from the cured assemblies, and for this purpose these are passed one at a time





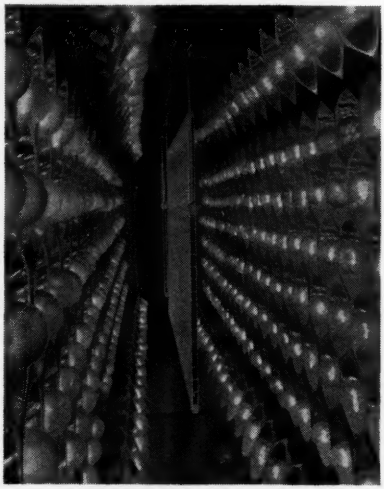
Right : In the mandrel-extracting machine the heads of the mandrels engage with projections from the drawing heads. Below : On each sawing table each saw wheel is individually driven; carriage motor at bottom



One side only of the board is sprayed in each chamber

to the central chamber of a hydraulic extracting machine in which the assembly is clamped. In doing this the heads of the mandrels engage with projections on two drawing heads of the extraction machine, i.e., one at each end. The extraction heads are initially operated to give outward pulls to the mandrels at about the same pressure as the curing pressure on the main press.

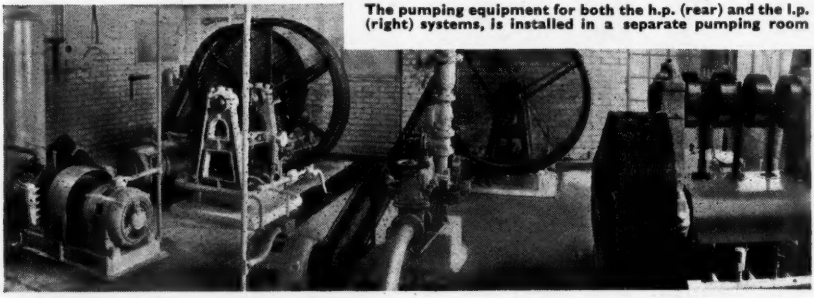
When the boards are rid of their mandrels they are passed along on the works roller conveyor system to the cutting room, where they are trimmed up to the required size of 8 ft by 4 ft. There are two machines for this purpose, one of which makes the longitudinal cuts and the other the cross cuts. These two sawing tables are similar, and in each case both edge cuts are made simultaneously. Each saw wheel at the table level is individually driven by a directly coupled motor, and the carriage to which the assembly is clamped and is drawn against the saws for cutting is driven by a continuous chain system to which the table is hooked by a special coupling. In the case of the longitudinal cutter each saw motor is a 3-H.P., 2,910-r.p.m. Metrovick unit, and the carriage motor a 1¾-H.P., 710-r.p.m. machine. Carriage speed is about 12 ft per minute.



In the drying chamber the board passes between two banks of infra-red lamps

The boards are now suspended from a mono-rail heavy-link overhead conveyor system which takes them, in turn, through two spraying chambers and a drying chamber. From the heavy-link chain there are downward projection pieces which engage with the rollers of the suspension hooks which run on the mono-rail. The line is about 42 yards long and the speed is adjustable from about 2½ minutes to 10 minutes for the journey through the drying chambers only, i.e., about 20 ft. This speed variation is effected by a mechanical adjusting device in the transmission system from a heavily geared motor at one end of the conveyor to the heavy sprocket wheel which comprises the conveyor end drum.

One side of the board is sprayed in the first spraying chamber and the other side in the second chamber. The spray is a plastic material which provides a foundation for other paints. In the drying chamber the board passes between two banks of special infra-red Metrovick lamps. There are 200 of these lamps in each bank, and the governing idea is that the heat first penetrates through the sprayed material to the board and then dries outwards. In this way the very short time of only 5 minutes is required for drying



The pumping equipment for both the h.p. (rear) and the l.p. (right) systems, is installed in a separate pumping room

a board. Each lamp is mounted in a gold-plated reflector and is rated at 250 W.

We have already explained that something like 2½ tons per sq in. hydraulic pressure is required for the main curing pressure and the initial mandrel-extraction pressure. The operations of the charger and discharger and the continued movements of the extraction drawheads, however, require a pressure of only half a ton per sq in., so that two hydraulic systems are necessary. The pumping equipment of both systems is installed in a separate pumping room in which there are, at the rear, three three-throw high-pressure ram pumps, each driven by a 14-H.P., 575-r.p.m. Metrovick motor with transmission via multi V-belts which give a speed-reduction ratio of about eight-to-one. On the right is a three-throw ram pump, driven via a three-to-two speed-reduction transmission system by a 40-H.P., 570-r.p.m. motor. In this pump room are also a Pulsometer motor-driven centrifugal pump which supplies the circulating water for cooling the press platens, which is driven by a 15-H.P. motor with even-ratio belt transmission at 1,450 r.p.m., as well as a 12·5-H.P., 900-r.p.m. directly-coupled motor-driven compressor which serves the spraying rooms. The accumulators served by the pumping systems are modern vertical-tube equipments loaded with concrete blocks.

Royal Visit to G.E.C. Laboratories

Demonstrations of Lighting Developments

HER MAJESTY QUEEN MARY, accompanied by Princess Elizabeth, spent two-and-a-half hours inspecting the Research Laboratories at Wembley of the General Electric Co., Ltd., on May 16th. With them were the Lady Cynthia Colville, Major the Hon. John Coke and Miss Caroline Haslett. The Royal visitors were received by Sir Harry Railing, chairman of the company, who presented Mr. Leslie Gamage, the vice-chairman, and Dr. C. C. Paterson, head of the Research Laboratories.

An effective lighting demonstration had been arranged and Mr. H. G. Jenkins illustrated the development and operation of fluorescent lamps by the use of treated fabrics, minerals and powders. Queen Mary and the Princess were keenly interested and asked many questions which were much to the point. Mr. J. M. Waldram then showed by means of ingeniously contrived lantern slides the building-up of a road-lighting installation and Mr. W. R. Stevens exhibited an arrangement for showing the heating effects in a street-lighting lantern. In another laboratory the Royal visitors were shown by Miss Souter, B.Sc., an example of the small radio proximity fuse for anti-aircraft shells.

After looking into the vacuum physics laboratory and the surgery, the Queen and the Princess were shown by Mr. le Rossignol many examples of radio valves developed in the laboratories, including the largest short-wave transmitter used by the B.B.C., magnetrons, T-R cells, etc.

The study of vibration in a turbine wheel was demonstrated by Mr. L. B. W. Jolley with the aid of a cathode-ray oscilloscope and then in the same department the " Helmore " searchlight used by our aircraft for illuminating enemy machines was viewed from behind screens—a necessary precaution against an arc rated at 160 kW.

After inspecting the lamp life-testing and photometric departments, the party went on to the diamond laboratory where the processes

Queen Mary and Princess Elizabeth in the lamp-testing room of the Research Laboratories

of drilling and polishing wire-drawing diamonds were seen, explanations being given by Mr. R. E. Leeds.

The Royal visitors were interested in samples of the heavy metal developed by the company—an alloy of tungsten, copper and nickel used for making radium containers and for balancing the ailerons of aircraft. They were amused at the difficulty of lifting an apparently trifling piece of the metal.

At the end of the tour the Royal visitors took tea in the staff canteen and were then given an enthusiastic send-off by a large number of the 900 employees of the laboratories.

Views on the News

Reflections on Current Topics

THE new Royal Commission on Awards to Inventors is likely to have a more difficult job than its predecessor appointed after the 1914–18 war. As before, it will no doubt be pestered by all sorts of cranks and people who presented half-baked ideas to the Service Departments and imagined that certain later developments were entirely due to their genius. Without these the assessment of the value of contributions by real scientists and inventors will be hard enough—particularly in such a matter as radiolocation, for instance.

* * *

I see that the question of the multi-filament lamp has again been raised in a Sunday newspaper, after a long period of quiescence. A contributor stated that a lamp with three filaments was being withheld from the market but Mr. W. J. Jones, director of the Electric Lamp Manufacturers' Association, denies this and refers to the disadvantages inherent in the idea. He says that during the life of one filament the alternative filaments lose their efficiency which makes the purchase of a new lamp desirable. My experience of a double filament lamp which I tried a long time ago was that the burning-out of the first filament blackened the bulb so much as to render it useless.

Triple filaments were experimented with in radio valves years ago but abandoned because the first filament to fail almost invariably damaged the remaining ones.

* * *

Further evidence of the low cost of electricity in temporary houses comes from Chesterfield. Equipped presumably with the standard apparatus they have an average consumption of 52·1 kWh per week. This, says Mr. W. W. Grimes, the borough electrical engineer, in a report to the Corporation Housing Committee, is equivalent to an average weekly cost of 2s. 9d.

* * *

Mr. D. H. S. Sanderson, of George Bray & Co., Ltd., shares my annoyance at the use of the term "Institute" in connection with the I.E.E. He sends me a copy of the *Yorkshire Post* in which the Leeds Architects' Department advertises for an electrical engineer, stating that "candidates must be Associates of the Institute of Electrical Engineers." Mr. Sanderson questions whether it is associates who are really wanted, rather than corporate members, and he suggests that the city architect should know better than to use the word "Institute." I think that there is some excuse for this, for the architects' body is the Royal *Institute*. All the same I still do not like it.

An even more horrible example of the derangement of titles comes from the *Liverpool Daily Post* which, in a note upon the forthcoming jubilee celebrations of the Liverpool electricity undertaking, refers to the "Institute of Municipal Electrical Associations."

* * *

An application of electronic cooking which appears to have some possibilities is coffee roasting. An apparatus capable of roasting 96 lb of green coffee an hour is to be manufactured in the United States. Demonstrations of a prototype model, only slightly larger than a cash register, showed that it will roast a pound of coffee in 1 min 45 sec employing a temperature of 900 deg F. Advantages of the new roaster are stated to be a reduction in the loss of weight in a pound of coffee, which is from 16 to 18 per cent with the present processing methods, to 6 per cent, almost complete preservation of aroma and a saving of money.

* * *

A useful incentive to inventive genius in Canada is a prize of $1,000 awarded by the University of Toronto under a bequest of the late Aeneas McCharles. I learn that this year one of the discoveries for which the award may be won is "an invention or device that will lessen the dangers and loss of life in connection with the use of electricity for supplying power and light." Electrical fatalities in the majority of cases are the result of lack of thought or care, nevertheless anything that can be done on the technical side will be watched with interest.

* * *

There is a big market open for someone enterprising enough to produce a home recording apparatus at a reasonable price. I am thinking particularly of its application in recording radio programmes which one is unable to listen to at the time of their broadcast. Already in the United States a simple device for that purpose has made its appearance and, I understand, has been on view at the Chicago Radio Show this week. It is due on the retail market in a few months' time. Using paper tape, approximately 8 mm in width, impregnated with metallic powder, the instrument is claimed to be superior to the plastic tape recorder developed by the Germans. The price has not yet been fixed but it is stated that it will be comparable with that of the most inexpensive radio receivers.—**REFLECTOR.**

Coal Economy and Housing

Some Misleading Comparisons

By *P. Schiller*, M.I.E.E.

IN the competitive struggle between the gas and electricity industries for the domestic heating load, especially the cooking load, there has been a phase when the emphasis rested on comparison of consumption and cost, references to coal utilization being of a casual nature only. However, as after the 1914–18 war, public interest has again been directed quite generally to the aspect of coal conservation, and it may be expected that in the official endeavours to establish a national fuel policy this aspect will prevail. The intended nationalization of the coal and the gas and electricity supply industries would offer a basis for implementing such a policy, and those in favour of maximizing the benefits of electricity to the community will do well to keep a watchful eye on the ideological preparatory work already in full swing.

The Egerton Report

The Egerton Report[1] has coined the term "coal-economy efficiency" to denote the ratio of the usefully employed heat output of an appliance under normal domestic conditions to the total heat content of the coal used, whether burnt in the appliance or used in producing the gas, coke or electricity consumed in it. It contains the term "production efficiency," which for coal-fired appliances is taken as 100 per cent, and for gas, coke and electricity as 73, 73 and 18 per cent respectively. The 73 per cent represents the technical efficiency of the coal-carbonization process, and it has been common practice, particularly in gas circles, to identify this with the individual production efficiencies of both gas and coke production. The report mentions, however, an "alternative method," which assigns to coke a production efficiency of 100 per cent and to gas one of 48 per cent, but it gives the impression of favouring the conventional method, under which the coal-economy efficiency of gas appliances appears much superior to electrical ones. Accordingly, the combinations of appliances listed in the report put solid fuel and gas in the foreground.

In another place[2] the author has criticized the practice of identifying the technical efficiency of the coal-carbonization process with the thermal efficiency of gas production. By way of *reductio ad absurdum* he assumed an electric power station in which the boilers were equipped with carbonization equipment, the gas being burnt straight-away and the coke disposed of on the market. This process would, according to the method in question, result in an overall production efficiency of approximately 56 per cent—instead of the 18 per cent used in the Egerton Report. As a further consequence, electric heating would have almost twice the coal-economy efficiency of gas heating.

The Simon Report

The recently issued Report of the Fuel and Power Advisory Council[3] is based to a large extent on the preceding Egerton Report. While expressing his admiration of the Report as a whole, the author feels impelled to offer some criticisms in the light of his previous remarks on the question of gas-production efficiency.

The Report starts off with a table giving the coal-economy efficiencies (for continuous space-heating) of coal, gas, and electric fires as 20, 29, and 18 per cent respectively. It thus adopts the "conventional method" of calculating gas-production efficiency. Only in an appendix is it noted that the Egerton Report also mentions an alternative method, but a table is included, from which an extract is given below, which is based on the conventional method.

	Production efficiency	Appliance efficiency	Coal economy efficiency
A2. Coal in closeable fire (open) ..	100	40	40
A3. Coal in closeable fire (closed) ..	100	45	45
B2. Coke in closed stove	73	55	40
C1. Gas fire ..	73	40	29
D1. Electric fire ..	18	100	18

The original is noteworthy for an amazing omission: it does not state the efficiencies of coke in closeable fires, although the principal recommendation of the Report is that

REFERENCES.

1 *Electrical Review*, January 25th, 1946.
2 *Electrical Times*, January 24th, 1946.
3 *Electrical Review*, April 5th, 1946.

dwellings should be equipped with closeable fires and only smokeless fuels burnt there eventually. Here are the missing figures, worked out from the Egerton Report on the same basis as those above:

	Production efficiency	Appliance efficiency	Coal economy efficiency
B3. Coke in closeable fire (open) ..	73	45	33
B4. Coke in closeable fire (closed) ..	73	50	36

By comparison with A2 and A3, it will be seen that, while the appliance efficiency of closeable fires is assumed to be 10 per cent higher when using coke instead of coal, the coal-economy efficiency appears about 20 per cent lower, due to the coke-production efficiency being assumed to be 73 per cent. The point is that one cannot have it both ways. By encouraging the use of the technical carbonization efficiency for both coke and gas, the gas industry has had it in mind to boost the thermal efficiency of gas utilization at the expense of the hitherto disregarded thermal efficiency of coke utilization. The Simon Report has adopted this convention, but it does not appear to have coped with all the consequences.

"Working Efficiency"

Throughout its body the report concerns itself with the "working efficiency" of solid-fuel appliances, the term "working efficiency" being virtually equivalent to the term "appliance efficiency" used in the Egerton Report, and no reference whatever is made to the comparative coal-economy efficiencies of coal and coke utilization in the solid-fuel appliances recommended. The following quotations are significant:

> "(*a*) While no smoke is produced from smokeless solid fuels, it is extremely difficult to burn bituminous coal completely smokelessly in any appliance designed for use in a single dwelling, though much can be done to reduce the smoke by better design.
>
> "(*b*) Solid-fuel appliances, as a general rule, operate more efficiently with smokeless solid fuel than with bituminous coal. It is therefore important as far as possible to substitute smokeless solid fuel for bituminous coal."
>
> "We have shown that for all appliances for the individual small house smokeless solid fuel burns more efficiently than bituminous coal. . . . It is therefore of fundamental importance entirely to replace bituminous coal for use in the individual small house by smokeless fuel."

It need hardly be added that the principal potential source of smokeless fuel is coal carbonization, and that the recommendations of the Simon Report may thus lead to a necessity for fostering the gas industry; but it must be reiterated that in arriving at these recommendations no account has been taken of the loss of heat energy due to the carbonization process. For whatever method of assessing production efficiency is adopted, this loss cannot be disputed.

Carbonization Loss

In Appendix I to the Report, the coal-economy efficiency for all household uses of coke and gas combined is estimated at 25·5 per cent, based on a production efficiency of 73 per cent and average working efficiency of 35 per cent. The production efficiency—taken over from the Egerton Report—contains about 8 per cent in respect of tar, which is not burnt in the house (nor anywhere else, for that matter). The value of 73 per cent should, therefore, be reduced to 65,* thus bringing the 25·5 per cent down to 23. Comparing this corrected figure with the 40 to 45 per cent given in the same report for the burning of coal in closeable fires, it can be argued that by carbonizing raw coal instead of burning it in modern appliances, about 20 per cent of its heat content is lost; or, putting it another way, by burning the raw coal instead of sending it to the gas works, up to nearly twice as much heat (40 to 45 per cent as against 23) can be obtained usefully.

Now, while it is beyond dispute that atmospheric pollution by burning coal in old-fashioned open grates calls for remedial action, the Report itself admits in some places that it is possible to burn coal in modern appliances without excessive smoke emission. The question, therefore, arises whether the Report is justified in recommending complete replacement of coal by smokeless fuel, even if this means a substantial loss of potential heat, and heavy capital expenditure on additional carbonization and gas-distribution plant.

Additional gas-distribution plant could, of course, be dispensed with if carbonization were to be integrated with the electricity-generation process. By analogy with the calculation that led to the above corrected

* The same correction should be made in the two tables given above.

value of 23 per cent, it can be shown* that, even with an electrical production efficiency of 18 per cent, the combined coal-economy efficiency comes in this case to 20 per cent, i.e. only 3 per cent less. The Simon Report, however, in the Appendix referred to, compares the 25·5 per cent (which should be corrected to 23) with a coal-economy efficiency of 14·5 per cent for all household uses of electricity, calculated on the assumption of a production efficiency of 18 per cent and average working efficiency of 80 per cent.

We thus have a similar paradox to that mentioned earlier in connection with production efficiencies: Although common sense seems to say that carbonizing the coal first and burning the gas under the boilers of a power station is bound to be less economic than burning the coal direct, the generally adopted method of comparing coal-economy efficiencies proves the opposite, namely, that with 20 per cent in the former and 14·5 in the latter case, the former is decidedly more economic. The reason is, of course, that in the former case a proportion of the coal is not converted into electricity, but used for domestic heat production in the form of coke.

Comparing Gas and Electricity

The author suggests that agreement will have to be sought on an improved method of appraising coal-economy generally, and that the one conclusive way of comparing gas and electricity is this: Carbonization to be considered as an extraction process, the coke being a residue, equivalent to the raw coal. The gas production efficiency, excluding heat in the tar, does not exceed 45 per cent. As most of the gas is used for cooking, the average working efficiency cannot be higher than, say, 30 per cent, thus giving a coal-economy efficiency of 13·5 per cent, i.e., less than the 14·5 arrived at on a comparable basis for electricity. If it can be proved in actual practice that the working efficiency of coke in modern appliances is higher than that of coal, a certain adjustment could be made according to the quantity used.

It must be stated in fairness that, while not quite successful in avoiding the pitfalls of efficiencies, the Simon Report contains a recommendation that free competition should continue between gas and electricity. But by encouraging at the same time "the largest practicable increase in the production of smokeless solid fuels suitable for domestic purposes" it may induce official interference if free competition should cause the gas industry to be stunted, without the necessary quantities of coke coming forward from other sources, such as combined carbonizing and electric generating stations.

One recommendation of the Report deserves special praise: "that large-scale user trials should be undertaken by the Government."* This is the only way of replacing hypothetical use and working-efficiency figures by realities. Such trials would enable comparative annual consumptions of coke, coal, gas and electricity to be established for the various heating services and would also show whether it is possible to burn coal in modern appliances without causing undue smoke emission.

Conclusions

It appears that the method of comparing coal economy now in vogue requires reconsideration. In the case of "joint" products, promiscuous operation with percentage efficiencies is apt to be misleading. The most reliable method seems to be comparison of the quantities of raw coal required for supplying the total domestic heat requirements by various combinations of means.** Moreover, estimated working efficiencies of appliances will have to be replaced by authoritative data, obtainable through the large-scale user trials recommended in the Simon Report. These trials will also show whether reasonable smoke abatement can be achieved with modern solid-fuel appliances without a general switch-over to smokeless fuel. If necessary, however, the requisite

* On an average, 100 therms of coal yield at present 25 therms of gas and 41 therms of coke. After conversion into electricity, at an efficiency of 18 per cent, 4·5 of the 25 therms are left for use, and with a working efficiency of 80 per cent (as estimated in the Simon Report) only 3·5 therms are usefully employed. The 41 therms of coke provide, at a working efficiency of, say, 40 per cent, 16·5 therms of useful heat. Altogether, out of 100 therms of coal, 3·5 + 16·5 = 20 are usefully employed, corresponding to a coal-economy efficiency of 20 per cent.

* This is preceded by the following statements: "Only by large-scale experiments under the best conditions can many of the problems which have come before us find a satisfactory solution." "We recommend that the modes of living of different families in houses of different design and with different combinations of heating appliances should be studied by scientific advisers on a large scale over a period of years."

** Due account has, of course, to be taken of the fact that the bulk of the coal used in electric power stations is unsuitable for house-purposes or town-gas making.

quantities of coke (and by-products) could be obtained by equipping future power stations with carbonizing plant.

Some time will have to elapse before final judgment can be passed. In the meantime, it can be assumed (1) that the prevailing conception of a decided superiority of gas over electricity in respect of coal-economy efficiency is fallacious; (2) that if solid fuel is to be used as the principal source of space-heating, it is economically justifiable to leave all cooking, summer water-heating, and auxiliary space-heating to electricity; and (3) that adequate quantities of coke could be made available without the necessity of distributing gas. For new housing schemes electric mains have to be laid down and houses wired at any rate—even if electricity were used for lighting only—and in present circumstances of acute labour shortage it would appear unjustifiable to allocate quantities of steel and man-hours to the work of duplicating these mains and house-installations by gas pipes.

Conditions in the Cable Industry

THE Joint Industrial Council for the Electrical Cable Making Industry has decided to grant an increase of 6s. per week of 47 hours to all adult male time and piece workers in Districts Nos. 1 and 2 to take effect as from the third pay-day in June. At the same time the adult female workers will receive an increase of 4s. 6d. a week and there will be proportionate increases for all workers under adult age. These increases will be added to the cost-of-living bonus. A schedule setting out the new rates has been issued.

For " Victory Day " it has been decided that all workers shall be paid for a minimum of 4½ hours at normal time rates. Those who usually work longer hours on Saturday will receive an amount equivalent to that which they would have earned normally, and those who are required to work on June 8th will be paid on the basis of time-and-a-half in addition to payment of 4½ hours' wages at normal time rates.

In view of the withdrawal of the industry from the scope of the Essential Work Orders the trade unions asked that the privileges enjoyed under the Orders in respect of welfare facilities, appeal against suspension or dismissal, and the guaranteed week should be continued. The employers say that they intend to maintain a satisfactory standard of welfare facilities and where there are welfare committees these should continue. It is recommended that employers should afford any aggrieved employee an opportunity to be accompanied by a representative from within the works when presenting his case against suspension or dismissal to the management and that the appeal should be made to an executive official of the company.

Guaranteed Week

A memorandum of agreement on the guaranteed week was tentatively adopted by the Council on May 15th. This provides that all employees, after four weeks' continuous service, shall be guaranteed payment for not less than 34 hours in any pay week at normal day rates. Employees must be capable of and available for work and willing to perform satisfactorily any services outside their usual occupations which they can reasonably be asked to perform when their normal work is not available for them.

Guaranteed payment will not apply (a) when the employers are prevented by strikes or other circumstances beyond their control from providing employment and have given four days' notice to their employers of the position; (b) where employees have been suspended for disciplinary reasons; or (c) where a recognized holiday falls within the period, in which case the guarantee will be reduced in the same proportion as the working hours have been reduced.

It is noted that the agreement does not prejudice existing practices in regard to the transfer of an employee as provided for in Clause 5 (a) of Agreements J.I. Nos. 510 and 511. Overtime payments and premium payments for work done on Sundays and holidays are not included in the guarantee.

I.E.E. Benevolent Fund

THE annual report and accounts of the Benevolent Fund of the Institution of Electrical Engineers show that at the end of 1945 the capital stood at £39,483, including a transfer of £3,500 from income. The latter increased slightly to £9,457, derived from investments, two legacies, subscriptions and donations, mostly less than £5 each. The average amount contributed per member (27,822) increased by 5d. to 5s. 7d., the 11,691 contributions representing 42 per cent of the total membership. Applications for assistance were made on behalf of 79 persons during the year, thereby also providing for 62 dependants. Grants increased by £81 to a total of £4,781, the average granted to each beneficiary being £60.

The Wilde Fund of £3,050, all invested, has an annual income of £105, all of which was distributed in grants to full members only and their dependants. The Lord Hirst Fund of £11,543 is all invested, producing about £346 annually. The Residential Homes Fund, started seven months ago, has reached £3,500, contributed by 530 members.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Room Circuits

REPLYING to the letter from Mr. B. Raynor in your issue of May 10th, concerning my recent article on the above subject, I would like to point out to him that my suggestion that the I.E.E. Wiring Regulations should be amended to permit the installation at a minimum cost of room circuits, consisting of an unlimited number of 15-A socket outlets in one room fed from a 15-A fuse by means of a 7/·029 cable, is not intended, as he evidently presumes, to be a merely temporary measure pending the availability of the new standard fused plug and socket outlet. The point is that the present form of the wiring regulations not only prohibits more than one 15-A socket outlet in a single room wired on a 7/·029 cable being provided (see regulation 201(B), but even when the new standard fused plug and socket outlet makes its appearance the number of socket outlets is limited to two (see regulation 201(C) (iii)).

He also considers that there are two objections at the present time to this arrangement if a B.S.546 15-A plug and socket outlet are used, in that the protection provided for small appliances and their associated flexibles will be inadequate, as the fuse rating will be many times their load, and the cost could be still further reduced. To overcome these objections he suggests as an alternative, that in each room a single 15-A socket outlet fed by a 7/.029 cable should be provided, on the incoming side of which could be looped out through a 5-A fuse a 3/·029 cable feeding a number of 5-A socket outlets.

Is, however, this danger of a 15-A fuse being inadequate protection to a small appliance and its flexible in actual practice a real one? I submit that actual experience does not show that it is so. It would be interesting to know for example, how many radio sets are in use to-day connected directly to 15-A socket outlets.

As regards the suggestion that both 15-A and 5-A socket outlets should be installed, this is the very thing which we wish to avoid, in that one single size of plug and socket outlet should be provided in future throughout a house in order to give the maximum convenience to the consumer. I also consider that to fix a sub-fuse on the wall adjacent to a socket outlet is a retrograde step. Obviously all circuit fuses should be contained in and situated at one point in a distribution board; here again the deciding factor is the convenience to the consumer.

*Shoreditch, N.*1. REG. H. RAWLL,
Borough Electrical Engineer and Manager.

Norwich Heat Pump

I WOULD ask Mr. Stevens to wait until the results are published of the five-year tests on coal-fired boilers, electrode boilers and the Norwich heat pump, all of which have been installed in our Duke Street building. These tests are in the nature of a careful scientific experiment, with accurate and continuous measurements of heat quantities. I expect the data to be published in a paper read before one of the institutions next session.

I am afraid that I cannot accept Mr. Stevens' statement that coke-fired central heating boilers have an efficiency of from 75 to 80 per cent. This sort of statement gains currency too easily and has no proper basis. I would suggest that the usual efficiency is about 55 per cent and only in exceptional cases where continuous technical supervision is given, does a coal- or coke-fired boiler (with automatic stoking) reach even 73 per cent. Where figures purporting to show boiler efficiencies are given, I should expect that there had been continuous and accurate measurement of the heat sent into the building throughout the whole heating season. I have in mind here the careful and continuous tests on coal-fired boilers which we have made in Norwich for four years.

Experience has shown me that these alleged boiler efficiencies of 75 to 80 per cent are usually obtained where the heat put into the building is "estimated" instead of measured —and the tests are usually twenty-four-hour tests instead of being continuous.

In the case of the Norwich City Hall heat pump, the actual demand will be 340 kVA against the present demand of 1,270 kVA. Nearly 90 per cent of the heat in the low-grade coal used at the power station will enter the City Hall, whereas not more than 55 to 65 per cent of the heat from much

higher grade coal would enter the building if coke- or coal-fired boilers were used.

I agree with Mr. Stevens that it would be an advantage if the latent heat in the steam rejected to the condenser at the power station could be used (or even some of it used) at the power station. The difficulty is to convey that heat from the power station to the premises where it is required. In some cases the heat demand is reasonably adjacent to the power station, but in many cases the cost of transmitting heat over a long distance would be prohibitive.

Norwich. JOHN A. SUMNER,
City Electrical Engineer.

A "Call-up" Plaint

ONE sympathizes with Mr. Hodson in having to leave his business for service in the Forces, but one sympathizes more with the men who had to leave their businesses years ago and are now awaiting demobilization. Possibly Mr. Hodson will release one of these. He can hardly complain that he has no time in which to clear up the financial side of his business after being granted five months' postponement. Most people receive only ten days' notice.

Mr. Hodson is fortunate, in that his length of service is likely to be much shorter than it would have been if he had been accepted in 1940 when he volunteered.

Finally, does Mr. Hodson suggest that someone called up in the early war years should be retained so that he may continue to run a business which the industry managed without until 1941 ? If he does I advise him, when mobilized, not to express the view in his barrack room.

Harrow. E. H. MALTBY.

Instantaneous Water Heaters

IN your issue of May 10th, Mr. Minter claims a superiority for instantaneous water heaters which they do not possess.

The load factor of a storage water heater is at least three or four times as good as that of an instantaneous heater for the same amount of water heated. Unless the diversity of the latter is greater than three to four times that of the storage water heater (which is doubtful, since the storage water heater has a fairly good diversity) no superiority can be claimed for it. Low diversity (round peak-load period) would strain the supply system far worse than the storage water heater due to the higher demand, besides requiring larger mains sizes. A storage heater makes a far less strenuous demand on the supply system and a good diversity is ensured by thermostatic control.

Supply undertakings usually allow a special rate for suitably controlled storage water heaters, but it is doubtful if they could be induced to grant the same concession for an electrode boiler load unless a minimum consumption was guaranteed (which amounts to promising a good load factor). In fact there is often a tendency to discourage the connection of water heaters of the instantaneous type.

The only argument in favour of the instantaneous water heater is its low initial cost and compactness as compared with storage water heaters.

Oxford. U. K. PATVARDHAN.

SPEAKING of water heaters, when is someone going to invent one of the 1½ gallon type which will give a cup-full of hot water (no more and no less) when required ?

All those I have used so far produce either a few reluctant drops, if a quick turn of the valve is given; or, with a longer opening, erupt like Vesuvius, producing at least a pint of hot water with tremendous force, most of which has to be wasted if a small quantity only is required.

Is this the best we can do, or have I been unlucky ?

Bristol. "A.M.I.E.E."

Unsafe Installations

IN his letter published in your issue of May 17th Mr. A. Smith seems to me hasty in his condemnation of the electrical engineers who had the misfortune to be responsible for the installations in question, in the light of the few facts given. It is not, for instance, stated whether the supply was a.c. or d.c.

As in pre-war days, many people have been buying large quantities of accessories and cable from general shops to put in additional points or run flex, possibly, from a 15-A socket-outlet under the carpet for a lamp or radio. I have seen many good installations spoilt by improper wiring (with earthing continuity severed) which has been added by people whose normal occupation is something quite different.

Some people can withstand electric shock better than others. A large number of all-metal-frame appliances are coming on to the open market now. Desk striplites, with no

earthing contact at all, have even found their way into bathrooms for use as mirror lights. Metal-framed fires with no earthing contact are placed on tiled floors in halls and kitchens. One can often get a nasty shock from American midget radio sets made for 110 V in a kitchen, with a stone floor, by just touching the grub screw of one of the knobs.

Electricity supply undertakings are apt to convey the impression that they are the only bodies capable of carrying out efficient installations, but many "independents" differ on this point. (I have seen three-pin plug connections with no wiring to the earthing pins.)

It is time the general public were widely informed of the possible danger of portable electrical appliances in bathrooms and on stone floors unless earthing is effective. I recall seeing, before the war, a garage light wired, in the cheapest flex, from the live contacts of a three-plate rose through a window frame, through a hole in the corrugated-iron garage roof, round a rusty iron girder, to a switch at the garage door. Another recollection is of a lady who bought a cheap vacuum cleaner and tried to suck up a pool of water from the kitchen floor in a hurry.

It remains to be seen what will happen about television when it becomes popular and unskilled users make an effort at adjusting their sets.

St. Albans. L. GENT.

REFERRING to Mr. P. A. Smith's comments on a coroner's statement, I would say that such statements are not unusual. In many such cases coroners and courts of inquiry return such verdicts as "Death by misadventure," etc. In my opinion, in nine cases out of ten, the correct verdict would have been "Preventable death" with a rider that steps should be taken immediately to prevent such recurrences.

Glasgow. A. MILNE.

Poor Propaganda

WHEN are we to see the publicists issuing propaganda worthy of the electrical industry? While no name is attached to the effort one can be fairly sure that the E.D.A. is behind the idea—and the times—by reason of the essential futility in which the subject is wrapped. "Electricity Improves", Improves what? Not its own ideas. Here is a case of: "See to thine own house." It suggests an apology that things have not been too good in the past. It ties up with nothing topical and has no pull whatever.

Now for a little constructive criticism. The problem of the hour, and the years, are "Food, Work and Homes." What an opportunity. "Electricity lightens work," "Electricity brightens homes," "Electricity saves food."

I have received the enclosed example of discourtesy attached to my current electricity account, urging me to "Save Electricity—This Means you." On comparing my account with the one for the same quarter of last year I find that it shows a saving of 22·5 per cent. Is this specimen of vulgarity justified under the circumstances, or for that matter any circumstances? So far as supply at a favourable two-part tariff is concerned I am well satisfied with the Richmond (Surrey) Electric Light & Power Co. The same cannot be said of their indiscrimination coupled with now out-dated dictatorship. Possibly they are anticipating the code of conduct required of them if and when the Government takes them over.

Kew Gardens. WARING S. SHOLL.

Domestic Appliance Design

I FEEL I must refer to the letter by Mr. J. Mortimer Hawkins which appeared in your issue of April 26th criticizing the design of electrical appliances in general and a bed-warmer in particular.

Most people with a modern outlook will sympathize with Mr. Hawkins' desire for the blending of imagination with technical knowledge in new designs for appliances, but manufacturers are frequently in such a "flat spin" trying to raise the output of existing lines that they simply haven't the time to look around for that little bit of help and guidance which is so badly needed in the early stages of developing a new line.

It would help them if buyers' guides gave particulars of the design services able and willing to assist from the technical, commercial or artistic standpoints.

*Westminster, S.W.*1. HORACE P. HOCKLEY,
Managing Director,
Technical Designs, Ltd.

Four Millionth Telephone Installed

THE Postmaster-General (Lord Listowel) on Monday presented a gold-sprayed, inscribed telephone to Mr. John Cliff, chairman of the L.C.C., in Mr. Cliff's office at County Hall. It was the 4,000,000th instrument to be connected with the Post Office system. Lord Listowel said that they were installing new telephones at the rate of 60,000 a month, 75 per cent above the pre-war rate.

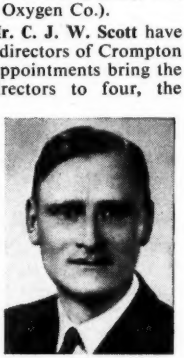
PERSONAL and SOCIAL

News of Men and Women of the Industry

AMONG the members of the new Council of the British Welding Research Association, of which Sir William Larke, K.B.E., is president, are Sir Stanley Goodall, K.C.B. (chairman), Dr. J. F. Baker (Professor of Mechanical Sciences, Cambridge University), Mr. I. R. Cox (Metropolitan-Vickers Electrical Co.), Sir Claude Gibb (C. A. Parsons & Co.), Lt. Col. Sir John Greenly (Babcock & Wilcox), Mr. V. E. Greenwood (Murex Welding Processes), Dr. J. H. Paterson (Arc Manufacturing Co.), Sir Frederick Stewart (Thermotank, Ltd.), and Mr. W. W. Watt (British Oxygen Co.).

Mr. J. V. Daniel and **Mr. C. J. W. Scott** have been appointed executive directors of Crompton Parkinson, Ltd. These appointments bring the number of executive directors to four, the

Mr. J. V. Daniel



Mr. C. J. W. Scott

others being Mr. B. Moore and Mr. R. E. P. Briebach. Mr. Daniel holds the position of general sales manager of the Plant Division, which is responsible for the sale of electric motors, transformers, switchgear, paper cable, electric trucks, meters and instruments. He has been with the company and its subsidiaries for eighteen years and has held a number of important positions in the organization both at home and overseas. Mr. Scott, who has been with the company for sixteen years, is general sales manager of the Supplies Division which is responsible for the sales of lamps and lighting equipment, rubber cables and car starter batteries.

Mr. R. L. Edgar, mains engineer to the Warrington Electricity Department, is to retire in October, after twenty-seven years' service with the undertaking.

Mr. Daniel McVey, whose resignation from the Commonwealth Public Service was recently announced, has been appointed chairman and managing director of Standard Telephones & Cables Proprietary, Ltd., Australia, to succeed **Mr. Trenam,** who has retired. Mr. McVey has been Director-General of Posts and Telegraphs, Government of Australia, since December, 1939. In addition he has held the positions of Director-General of Civil Aviation, Director-General of Aircraft Production, chairman of the Radio Physics Board, member of the Radio Research Board, and he is Commissioner of the Australian National Airlines Commission.

Mr. H. H. Lawrence, A.M.I.E.E., meter superintendent, Reigate, has been appointed consumers' engineer. Mr. Lawrence, who joined the Electricity Department in 1929, served with the Admiralty (Mine Design Department) during the war. **Mr. H. C. C. Keen,** Graduate I.E.E., who now becomes assistant consumers' engineer, joined the undertaking in 1933 and served with the R.E.M.E. from 1939 to 1946.

Mr. E. Cook, deputy borough electrical engineer of Wallasey, is to retire next month.

Mr. Arthur Delaney, chairman of the Marconi Radio & Telephone Company (Egypt), Director-General of Egyptian State Broadcasting, arrived by air from Cairo on May 16th for a four months' visit to this country, during which he will have consultations with Cable & Wireless, Ltd.

Mr. G. H. Holding has recently resigned his position with Newman Industries, Ltd., and has joined Stewart Thomson & Sons (Liverpool), Ltd., and their associated company, the Electric Machinery Co. (Manchester), Ltd. He has opened an office at 28, Victoria Street, Westminster (telephone: Abbey 2101).

Mr. R. W. J. Benyon, A.M.I.E.E., who is at present with the Beckenham Corporation Electricity Department, has been appointed consumers' engineer to the St. Helens Electricity Department. Mr. Benyon received his training in the Aylesbury Electricity Department and has subsequently held posts with the Barking, Colwyn Bay and Basingstoke undertakings.

Berry's Electric Birmingham Works' football team recently won the "Showells Brewery Challenge Cup" of the Birmingham and District Works Amateur Football Association, beating Higgs Motors in the final by five goals to three.

Mr. Geoffrey Robinson, who has for many years been with the General Electric Co., Ltd., is to join Lionel Robinson & Co., Ltd., as general manager on June 1st.

Mr. H. V. Major has been appointed general manager of P.R.T. Laboratories, Ltd., which carries out research work for Philco, Airmec and the other companies of the Radio & Television Trust group, as well as for companies outside the group and for Government Departments. Mr. Major, who has for some months been

acting manager of the company, was before the war associated with Pye Radio. During the war he was assistant director of radio production at the Ministry of Aircraft Production. Owing to the substantial increase in the volume of work, the laboratories and staff are being transferred to the Cressex Works at High Wycombe, Bucks.

Mr. J. Leaver, installation inspector to the Willesden Borough Electricity Department, who retired last month at the age of sixty-five after thirty-four years' service with the undertaking, was recently presented with a reading lamp and a wallet by his colleagues. The presentation was made by Mr. A. B. Catling, borough electrical engineer.

Mr. C. W. Durley, accountant to the Hampstead electricity undertaking, who is retiring after forty-five years' service with the Council, was recently presented by his colleagues with a watch. A cheque was also presented to **Mr. H. C. Reed,** chief clerk to the undertaking, who is retiring after forty years' service.

Mr. R. J. Alce, consumers' engineer, has retired from the Eastbourne Electricity Department after 40 years' service, and **Mr. G. W. Dumbrell,** assistant consumers' engineer, has been promoted to fill the vacancy.

Mr. R. Owen, for thirty years borough electrical engineer of Wigan, is retiring at the end of this month.

Mr. L. G. Aston has been appointed electrical engineer and manager to the Brierfield Urban District Council in succession to **Mr. N. Ashton,** who has taken up a similar position at Spenborough. Mr. Aston, assistant mains engineer to Willesden Borough Council, is now serving with the Admiralty at Bath, a post he has held for five years. Until he commences his new duties in July Mr. N. Ashton will act as consultant to the Brierfield U.D.C.

Mr. R. Hurd, B.A., has been appointed to the panel of architects of the North of Scotland Hydro-Electric Board. He has resigned his position on the Amenity Committee (Hydro-Electric Development Act), his place being taken by **Sir Frank Mears.**

The chairman of Sydney S. Bird & Sons, Ltd. Sir Ian Stewart-Richardson) announced at the annual meeting that **Mr. Sydney S. Bird** had decided to relinquish the position of managing director but would remain on the board as technical adviser. He was succeeded as managing director by **Mr. S. E. C. Bird,** whose place as works director was being taken by **Mr. Murray Irving.**

Mr. H. Broughton, general manager of the Burnley, Nelson and Colne Joint Transport Board since 1939, has intimated his intention to retire on superannuation at the end of August. He joined the staff of the Burnley (Lancs) Corporation Tramways Department over forty years ago and held various posts on the administrative side of the undertaking. When the department was merged into the Joint Transport Board in 1933 Mr. Broughton retained his position as chief administrative clerk, being appointed general manager in succession to Mr. C. H. Stafford in 1939.

Mr. L. A. Doxey, public lighting superintendent at Derby since 1936, has been appointed the first city lighting engineer of Leeds and will take up his new duties on July 1st. He will have the task of converting the city's 23,000 gas lamps to an all-electric system. Mr. Doxey, who was born at Derby in 1900, received his education at Ashbourne Grammar School and his training as a pupil of Mr. T. P. Wilmshurst, then borough electrical engineer of Derby. From 1920 he served in the street lighting section of the distribution department, being appointed engineer in charge of street lighting in 1924. A separate street lighting department was formed in 1936 under the borough electrical engineer and Mr. Doxey was appointed superintendent. He is a member of the Association of Public Lighting Engineers and the Illuminating Engineering Society.

Mr. L. A. Doxey

Mr. F. E. Butcher has joined Electro Methods, Ltd., as chief engineer. After serving his training period with Bull Motors, he spent four years as the company's chief designer. He then went to Black & Decker, Ltd., acting for two years as service manager and for six years as chief electrical engineer, followed by two years as chief development engineer to Rotax, Ltd. He has served on several B.S.I. committees, and is a member of the A.S.E.E. Swann Diploma Committee and one of the advisers to the examiners for this scheme.

Dr. R. H. Barfield, A.M.I.E.E., A.C.G.I., is joining the research and development staff of Wild-Barfield Electric Furnaces, Ltd. Dr. Barfield is well-known in radio and electrical circles on account of contributions he has made to scientific developments over the past twenty years, particularly in relation to radio engineering. He is at present on the research staff at the National Physical Laboratory, from whom he was seconded during the war to assist in work of special importance in the Army.

The Johnson Matthey Dramatic Society recently gave two performances of Esther McCracken's play " Quiet Wedding " at Toynbee Hall, E.1. Among a very talented cast Mildred Harker was particularly effective as Janet Royd, the bride. Mr. Frank Braby is to be congratulated on his ninth production for the Society.

The following awards have been made by the Worshipful Company of Tin Plate Workers *alias* Wire Workers:—Scholarships (value £50): D. G. Mainwaring (W. Gilbertson & Co., Ltd.), Joyce L. Grieves (Elba Tinplate Co., Ltd.), K. H. Dolman (International Combustion, Ltd.), C. P. Chesters (W. T. Glover & Co., Ltd.), W. Gibbs (W. T. Henley's Telegraph Works Co., Ltd.) and C. E. Pardey (Enfield Rolling Mills, Ltd.). Prizes of £10: J. W. J. Clarke (English Needle & Fishing Tackle Co., Ltd.), V. A. Burton (Standard Telephones & Cables, Ltd.), J. Heaton (British Insulated Callender's Cables, Ltd.), P. E. Rainger (Standard Telephones & Cables, Ltd.) and J. E. Brittain (Enfield Rolling Mills, Ltd.).

Mr. R. Stuart Pilcher, C.B.E., general manager of the Manchester Corporation transport undertaking, has been elected president of the Institute of Transport for 1946-47. As already announced, Mr. Stuart Pilcher is to be the Regional Transport Commissioner for the Midland Area, with headquarters at Birmingham, from July 1st. He is a past-president of the Municipal Passenger Transport Association.

Mr. W. Hewlett, for the past eight years mains superintendent at Preston, has been appointed deputy borough electrical engineer of Tunbridge Wells.

Mr. L. J. Hooley, deputy consumers' engineer in the Heston and Isleworth Electricity Department, has been recommended for the position of deputy consumers' engineer and meter superintendent with the St. Pancras Electricity and Public Lighting Department.

Presented by the Hoover Concert Party, "It's in the Bag" had a very successful three-night run at the company's Perivale factory on May 14th-16th. Audiences totalling 1,500 saw the talented show. Especial credit is due to Miss Joan Clarke for her aria "One Fine Day," and to Miss Marie Ashdown and Mr. Bernie Harris for their act "An Attempt to Sing."

Mr. A. E. Clarke, M.I.E.E., chief engineer of Stretford and District Electricity Board, is shortly retiring and **Mr. H. G. Bell,** M.Sc.Tech., M.I.E.E., has been appointed to succeed him.

Mr. Roger Clegg, of the Royal Aircraft Establishment, Farnborough, has been appointed district mains engineer for the Cosham area of the Portsmouth Electricity Department.

At the annual meeting of the North of England Branch of the Association of Mining Electrical and Mechanical Engineers at Newcastle-on-Tyne, **Mr. Luke H. Forster** was installed as president in succession to Mr. W. B. H. Lockerbie.

Obituary

Mr. Frank Morgan, M.I.E.E., electrical engineer to the Bredbury and Romiley Urban District Council, for the past twenty years, died on May 12th at the age of sixty-three. Before the war he was a teacher of electrical engineering at the Manchester School of Technology.

Wills.—Mr. F. C. Raphael, consulting electrical engineer, left £8,191.

Mr. F. Samuelson, director of the British Thomson-Houston Co., Ltd., left £40,661.

South African Notes

From Our Cape Town Correspondent

A HEAVIER weight than has ever before been handled at Cape Town docks was put ashore there in March. It was a stator weighing 98 tons for the Table Bay power station extensions. It was manufactured in England and shipped in the Ellerman cargo steamer *City of Barcelona.* For weeks the Table Bay harbour, railway and municipal officials prepared for the arrival of the stator, which was too heavy for the port's floating crane, designed to lift up to 60 tons. The ship has a derrick that can raise 120 tons and by this means the stator was transferred from the ship's hold to a specially strengthened railway truck.

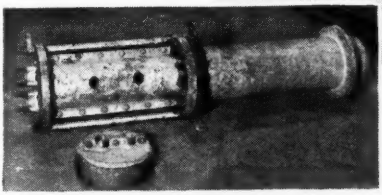
Electricity and Irrigation.—By supplying electricity to farmers along portions of the Vaal, Riet and Hartz rivers the Vaal River Electrification Board hopes to make it possible for a large area of land to be irrigated. Power would be supplied from Kimberley by transmission lines which would run to Barkly West and down the Vaal to Douglas, then up the Riet River to its junction with the Modder, where a line would return to Kimberley. Besides farmers, industrialists are interested in the scheme and two lime works will take about 3,000,000 kWh a year each. The largest cheese factory in the Union, established at Douglas, with a capacity of 9,000 gallons of milk a day, will also require a supply. The Vaal River Electrification Board was only formed a few months ago, and the chairman describes its progress as phenomenal.

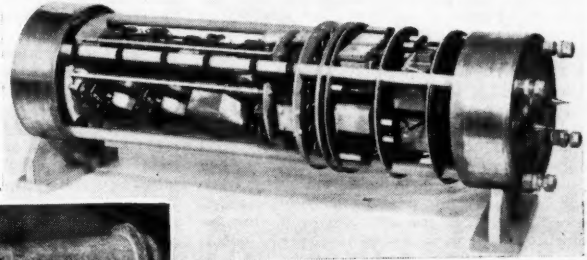
Price Control.—The temporary imposition of maximum prices on all types of household electrical appliances, based on a profit of 85 per cent on the determined cost, has been welcomed by most electrical appliance dealers in South Africa. A director of a firm importing mainly electric stoves and refrigerators said that he considered the figure of 85 per cent reasonable on the whole, though perhaps generous in the case of electric irons and kettles. In the case of refrigerators and stoves he thought this profit margin might possibly lead to a small reduction in the period of guarantee given by dealers.

Telecommunications Research

Activities of the G.P.O. at Dollis Hill

PROGRESS in organized research in this country may be illustrated by developments in the facilities provided by the General Post Office. Starting with a few laboratories in the City in 1904, the main work was concentrated in 1921 at the Dollis Hill site where, twelve years later, the present permanent buildings were inaugurated. Its war service completed, the research station with its staff of 750, under the Controller of Research, Dr. W. G. Radley, is now able to devote its first attention to applying discoveries in physical science to telecommunications in addition to fundamental investigations, particularly in connection with the properties of materials. In developing the resulting apparatus and systems full co-operation is maintained with manufacturers. During a recent visit to the station, an opportunity was given to inspect many examples of the programme now in hand as well as of systems that have recently been put into service. One of the latter is the a.c. apparatus (600 and 750 cycles per sec.) devised for using pulses of voice-frequency current for direct dialling over trunk mains, the repeaters in which cannot pass d.c. as used for local exchanges. This system is at present in operation over 2,115 long-distance circuits.





Interior (top) and exterior (left) views of repeater for under-water operation, having three stages of amplification with two spare valves which can be switched in from the shore

A replica of the submarine repeater installed two years ago between Holyhead and the Isle of Man was on view, the first of its kind in the world, although speech amplification using repeaters at from five to forty miles apart are now standard practice for long-distance telephony on land. By its means the frequency band of transmission has been increased from up to 228 to 504 kc/s, raising the number of circuits from 24 to 48 at the normal spacing of 4 kc/s.

Demonstrations were given of the " vocoder " system, in which speech (resulting from air vibrations corresponding roughly to the 7½-octave range of pitch of the piano) is analysed and transmitted in telegraph-like code and reconstructed at the receiving end. This method enables five or six conversations to be carried on instead of one. Eleven signals can be transmitted—ten defining the energy content in as many predetermined frequency bands and one the instantaneous basic pitch of the speech. The total frequency band is about 400 c/s instead of the normal 3,000.

Fading of radio transmissions, caused by mutually interfering signals as a result of variations in strength and vertical direction with changes in the ionosphere, is a major preoccupation of Post Office engineers. The most recent machine devised for simulating all forms of fading indicated the improvements made recently with the aid of which new radio systems are being worked out.

Equipment set up to observe oscillographically telephone conversations on the coaxial cable between London and Birmingham (the first in the world and now being extended all over the country) illustrated the freedom from mutual interference between the large number of speech channels. Instead of two pairs of wires being allocated to one conversation, two coaxial tubes of 0·375 in. external diameter can deal with 660 simultaneous conversations, entailing in every case the use of a small radio transmitter and receiver tuned to a specific wave length. With channels spaced 4 kc/s apart, a fully loaded cable would fill a frequency band up to about 3 megacycles per sec. Repeaters at six-mile intervals are necessary to amplify the strength of the waves.

All processes in the production of crystals from the choice and cutting of the quartz to precision adjustment and mounting are undertaken in the laboratory. These are used to stabilize the wavelength of radio transmitters,

e.g., for the B.C.B., and to select signals of specific wavelengths. They were also incorporated in "Gee," which enabled the R.A.F. to carry out 1,000-bomber raids, and in the quartz clock supplied to the Royal Observatory, which over short periods is more constant than the period of rotation of the earth and can measure time within 0·001 sec. per day. On different lines is the use of photo-electric cells in a machine undergoing tests which arranges mail up to 6½ by 4½ in. in size with the stamps in the same relative position for cancellation at the rate of 600 per minute.

At present a large part of the premises is given over to the training of engineers, but this work is to be transferred shortly to the Midlands, thus leaving room at the Dollis Hill establishment for even more extensive research, a bigger proportion of which will be fundamental, with an expanded staff.

B.T.H. Company's Jubilee

THE fiftieth anniversary of the British Thomson-Houston Co., Ltd., is celebrated this month, the company having been formed on May 18th, 1896, from an organization which had developed from the original London firm of Laing, Wharton & Down, which started trading in 1886. The Thomson-Houston partnership really began in America about sixteen years before the present company was formed in England. Elihu Thomson, was a Manchester man, born in 1853, who settled with his parents in Philadelphia and at the age of twenty-three became Professor of Chemistry and Physics in the Central High School. E. J. Houston, who was born in Alexandria, Virginia, in 1847, was a colleague at the same school and eventually became Professor of Natural Philosophy there. An American, named Churchill, of New Britain, invited these two to join him in forming the American Electric Co., which later became the Thomson-Houston Electric Co., and, eventually, the General Electric Co. (of New York, U.S.A.).

The connection of the Thomson-Houston Electric Co. with this country commenced in 1886 when the firm of Laing, Wharton & Down was formed to exploit in Great Britain the sale of apparatus made by the Thomson-Houston concern in America. The first sign of actual manufacture was the formation of "British Thomson-Houston, Ltd." in 1894. This new company no longer acted merely as agent, as it had purchased the existing patents of the American company with the exclusive right to manufacture and sell machinery and apparatus under the patents in Great Britain and Ireland. In 1896, the name was changed to "The British Thomson-Houston Co., Ltd."

During the first year or so of the B.T.H.Co.'s existence the only manufacturing facilities were at a small works and store at Bankside, London, but many pioneer electric lighting, tramway, and railway installations were undertaken. At this time the company carried out the contract for the power station, substations and electrical driving equipment for the trains on the new Central London Railway ("Twopenny Tube").

The need for greatly increased manufacturing facilities becoming evident, about 25 acres of land at Rugby was purchased in 1900, and manufacturing commenced in 1902. These works were planned for about 800 operatives, and had a floor space of about 206,000 sq ft. Since then the various departments have expanded under such farsighted guidance as is associated, for instance, with the names of H. N. Sporborg, F. Fraser, R. Dumas and F. Samuelson. To-day the Rugby works occupies 120 acres on the original site, while there are works at Coventry, Willesden, Birmingham, Chesterfield, Peterborough, Nelson, Newcastle-under-Lyme, Colne and elsewhere. The country is covered by a network of district offices, while the company has offices, or representatives in most countries.

Research has always been an important part of the organization under the direction of R. C. Clinker, H. Warren (now the managing director), and the present director of research, L. J. Davies.

The jubilee year of the company finds it in the throes of the change-over from war to peace conditions. Many alterations in organization are taking place and an entirely fresh outlook is being unfolded both at home and in the export field.

Forthcoming Events

Saturday, May 25th.—*Bath.*—Forum Cinema, 3.30 p.m. I.E.E. Bristol Students' Section. Annual general meeting.

Tuesday, May 28th.—*London.*—School of Tropical Medicine, Gower Street, 7 p.m. Society of Instrument Technology. "The Design of Automatic and Manually Operated Control Systems," by Dr. A. Porter.

Coventry.—Electricity Showrooms, Corporation Street, 6 p.m. Coventry Electric Club. Annual general meeting.

Thursday, May 30th.—*London.*—Connaught Rooms, W.C.2, 12.30 for 12.55 p.m. Batti-Wallahs' Society. Luncheon and address on "Electrical Research in Wartime," by J. M. Waldram (G.E.C.).

Friday, May 31st.—*London.*—Royal Institution, 21, Albemarle Street, W.1, 5.15 p.m. Friday evening discourse: "Electric Fishes," by Sir Henry Dale.

Saturday, June 1st.—*Cardiff.* Association of Mining Electrical and Mechanical Engineers (South Wales Branch). Annual general meeting.

Supply Companies' Meeting

Improvement Without Nationalization

THE annual general meeting of the Provincial Electric Supply Association on May 15th was preceded by a luncheon at which the chairman (MR. SELWYN S. GRANT, O.B.E.) presided. Welcoming the guests, Mr. Grant referred to the presence of Sir Cyril Hurcomb, chairman of the Electricity Commission, Mr. A. E. Marson, secretary of the Commission, Mr. Leslie Gordon, chairman of the Joint Committee of Electricity Supply Organizations, and Mr. Harold Hobson, chairman of the Central Electricity Board. He mentioned that the Association represented over one hundred companies.

SIR CYRIL HURCOMB, in responding, referred to the uncertainty in which the electricity supply industry was now operating. Some, he said, spoke of the shape of things to come; others of the shadow of things to come. Whatever happened, nobody could question the efficiency of the industry. There could be improvement but changes in organization could only be based upon the experience of those who were now running the industry. The undertakings were anxious to get on with normal development but they found it hard to obtain the necessary materials or, if they were interested in generation to obtain the sites. It was difficult to see what would happen under planning; the Commissioners were sometimes in difficulties, or even conflict, with other authorities in matters of planning. After a reference to the industry's war record, Sir Cyril said that the Commissioners welcomed contacts with representatives of the companies as a means of letting daylight into offices which might otherwise develop bureaucratic ideas.

Annual Meeting

At the subsequent annual meeting Mr. Grant referred to the retirement from the Executive Committee of Lord Erskine, Sir Thomas Bethell and Mr. Spencer Hawes, and to the appointment of Messrs. Pond, Jackson, Oakley, Rankin and Woods (Woking) to fill the vacancies. Mention was also made of the death of Mr. E. G. Baker, the secretary, who had been succeeded by Mr. J. M. Graham, secretary of the County of London Co. and its associated companies.

Mr. Grant paid tributes to the work of the vice-chairman (Mr. A. J. Fippard) who was now chairman of the Conjoint Conference of Public Utility Associations, and that of Messrs. G. R. J. Parkinson and H. Bentham. He said that the vice-chairman and Sir John Dalton represented the Association on the committee which was now sitting with the Ministry of Fuel and Power to discuss the problem of expenditure incurred or to be incurred during any interim period pending nationalization.

The Association had taken part in the voltage standardization discussions. They did not yet know who would meet the cost; the question needed careful consideration if injustice was not to be done for some undertakers had already changed to 230 V, the former standard, and had borne the heavy cost. Messrs. Bentham and Fennell had been suggested as members of the Commissioners' committee on methods of charging for electricity. He had nothing definite to report regarding the industry's war damage compensation claims, but there had been further discussions with the Treasury and the Electricity Commissioners.

A joint liaison committee was being set up by the National Farmers' Union and the electricity supply associations concerned for discussing matters of common interest; the Association was represented by Messrs. Aylott, Bentham, Guinness and Pond.

Contact with Consumers

Mr. Grant said that much more attention should be given to the remedying of the shortage of material needed by the industry. Possibly the only good reason for nationalization was that a State-owned industry would get a better share of the supply of poles. Dealing with the Government's proposals for the nationalization of the mines, Mr. Grant pointed out that the Government had said nothing about taking over the distribution of coal; the number of distributors must run into thousands. Yet the electricity supply industry was told that 500 undertakings were too many although the detail involved was possibly as great and as personal as that involved in coal distribution. Local contact with consumers was all-important and quick decisions, particularly when a consumer was dissatisfied, were equally necessary.

The Government claimed that it had a mandate but only half of the country's electors voted for its programme. They considered it their duty to oppose measures which they conceived to be against the public interest and come out with what they believed. The solution to the problem of giving the best service to consumers had found many voices from among those responsible for the management of the components of the industry. In principle there was general agreement covering the following points:—Electricity should be allowed to develop its service separately from other forms of fuel and in healthy competition with them. The present electrical legislation was antiquated and restrictive in the sense that amalgamations which would be in the consumers' interests involved going to Parliament for consent—generally a long and expensive business. They believed that the present part municipal and

part company ownership should be retained but should be subject to further control by the Electricity Commissioners, who should be given greater powers. Part of these powers should consist in the establishment of committees on an area basis to investigate matters appertaining to supply in their areas and, if necessary recommend amalgamations which the Commissioners should have power to approve after hearing the parties concerned.

In conclusion Mr. Grant said that to think that rehabilitation would be helped by converting all the supply undertakings in the country into a few vast regional bodies was dangerous dreaming and he asked for the members' support in their efforts to make the Government see some sense in the whole matter.

A resolution was passed opposing the principle of State ownership of the electricity supply industry. The accounts for 1945 were adopted and members of the Executive Committee were re-elected.

PARLIAMENTARY NEWS

By Our Special Reporter

Alleged Cartel Activities

LAST week in the House of Commons, Mr. A. Lewis asked the Minister of Supply whether, to counteract the cartel activities in the radio valve and electric lamp industries, he would consider introducing legislation to nationalize these industries. Mr. Wilmot said he had not seen evidence which would necessitate the course suggested.

Contractors' Supplies in Scotland

Mr. Hoy asked the Minister of Works if he was aware of the shortage of supplies to the electrical contracting industry in Scotland; and what steps he was taking to meet its requirements.

Mr. Wilson said that the supply of electrical components and accessories was limited, but was sufficient to meet the needs of priority work, and he was not aware of any particular shortage in Scotland as compared with other parts of the United Kingdom. His Department would investigate and take action in any specific cases where priority work was in danger of being held up due to shortage of these components.

C.E.B. Sales

On May 14th Mr. Palmer, asked the Minister of Fuel and Power if he would state the total number of kWh sold by the Central Electricity Board in 1944; and how much was sold to owners of selected stations at the grid tariff.

Mr. Shinwell said that the total number of kWh sold by the Board in the year 1944 was 34,439 millions, of which 1,784 millions was sold to the owners of selected stations at the grid tariff.

Mr. Palmer asked how many owners of selected generating stations elected to purchase their supplies of electricity from the Central Electricity Board for the year 1944, on each of the alternative charges.

Mr. Shinwell said that the year 1944, eighteen selected station owners purchased supplies from the Board at the grid tariff fixed under Section 11 of the 1926 Act; 90 at prices agreed between the Board and the owners under Section 7 (4) of the Act; and none on the basis of cost of production under Section 7 (4) (a). Cases only arose under Section 13 of the 1926 Act if agreement could not be reached on the cost of independent operation and a reference to the Electricity Commissioners was made. No such cases had so far been referred in respect of the year 1944.

Supplies for Scottish Schemes

Mr. M. MacMillan asked the Secretary of State for Scotland to what extent orders for plant and equipment for the North of Scotland Hydro Electric Board's schemes had been, and would continue to be placed in Scotland with Scottish firms; whether it was the intention of the Government to develop production within the hydro-electric power area of the Highlands for the supply of a reasonable part of such equipment; and whether, arising from his recent consultations with other Government departments, he would now make a statement.

Mr. Westwood said he was informed that rather more than half of the supplies and services involved in contracts so far placed by the Board were being provided by Scottish contractors, the balance being mainly in connection with machinery for which there was no manufacturing capacity in Scotland. It was the Government's desire that production of electrical plant and equipment should be developed in Scotland and the attention of industrialists contemplating such development was directed to the opportunities afforded by that country. The possibilities of the North of Scotland area would be borne in mind in suitable cases.

Radar for Navigation

Replying to Mr. Janner, the Minister of Transport (Mr. Barnes) said that some merchant ships fitted with radar apparatus during the war were retaining the apparatus for use as a navigational aid.. In addition 250 Admiralty sets of a later design were being issued to shipowners on hire pending the production of a Mercantile Marine set in accordance with the

Government specification. A model set complying with that specification had been produced by the Admiralty Signal Establishment and was now being demonstrated in H.M.S. *Fleetwood* to members of the shipping and radio industries. The mass of technical information accumulated during the war by the Government Research Establishments was being placed fully at the disposal of the manufacturers interested and several British firms were working actively to produce models. A first supply of commercial sets might be expected within the next few months.

Awards to Inventors

Mr. Attlee, Prime Minister, announced that a Royal Commission was being set up to determine what awards should be paid to inventors in respect of the user of their inventions, designs, drawings, or processes by Government Departments and Allied Governments during the war. The following would be members of the Commission:—Lord Justice Cohen (chairman), Mr. K. R. Swan, O.B.E., K.C. (deputy-chairman), Dr. G. M. Bennett, Lt. Col. Sir John Greenly, K.C.M.G., Lt. Col. Sir George Lee, O.B.E., M.C., M.I.E.E., Sir James Rae, K.C.B., Sir William Stanier, F.R.S., and Mr. R. G. Lloyd, M.A., B.Sc., Barrister-at-Law (secretary). The Commission followed the general lines of that set up in 1919 and would normally sit in public.

Colliery Electricity Undertakings

During the report stage of the Coal Industry Nationalization Bill in the House of Commons last week, Mr. Shinwell, the Minister of Fuel and Power, moved an additional proviso to the First Schedule (Assets to be Transferred to the Board) to provide for the taking-over of colliery electricity activities, namely, the generation and supply of electricity consumed exclusively or mainly in the course of colliery production, transport, sales or welfare activities. He explained that the National Coal Board did not propose to embark in the generation or distribution of electricity, but inasmuch as certain colliery undertakings carried on these activities at present, it was intended that they should be transferred.

The Bill was read a third time on Monday last.

Telephone Service

Lord Listowel, the Postmaster-General, in moving the Second Reading of the Post Office and Telegraph (Money) Bill in the House of Lords, said that the extensive arrears of telephone work that must now be overtaken, explained why the amount of money provided for in this Bill—£50 million—was larger than on previous occasions. The Post Office would also take over for its own use a certain amount of plant which was constructed for war purposes, and the cost of which was borne upon Votes of Credit. The borrowing powers of the Bill would be used to the extent required for the cost of this new plant. The total sum of £50 million should meet requirements until about June, 1948. Last month there was, for the first time, a reduction in the size of the waiting list for telephones in the London region. There was good reason to think that they had now turned the corner in London, and that fresh installations would continue to reduce the number of people waiting for a telephone. Since the end of the war, demands for telephone service had been coming in at a greatly increased rate, in recent months at more than double the pre-war rate. The Post Office was making a great effort both to cope with the current demands, and to clear off outstanding cases, while at the same time it endeavoured to improve the telephone service. It had already increased the installation of telephones to the rate of 60,000 a month, nearly 75 per cent more than the pre-war rate, in spite of the continuing shortage of engineering staff.

In regard to taking over for the public service a considerable part of the plant laid down for war purposes, he mentioned that the defence services had already surrendered several thousand trunk circuits, and there were now in use for public trunk calls more than 12,000 circuits for distances over 25 miles. This compared with fewer than 7,000 of these long-distance circuits before the war.

Radio Valve Costs

On May 15th, Maj. C. Poole asked the President of the Board of Trade if he was yet in a position to report on the manufacturing costs of radio valves.

Mr. Belcher said that the Central Price Regulation Committee would be submitting its report very shortly.

Development in East Africa

Mr. Dodds-Parker asked the Secretary of State for the Colonies whether any arrangements had been made for the committee of experts on electrical development now touring East Africa to visit Nyasaland and Northern Rhodesia.

Mr. G. Hall said they had not, but should the Governments of those territories consider it desirable, the undertaking of a similar inquiry might be considered in the light of the report of the present technical commission on East Africa.

Wireless Licence Fees

Mr. Burke announced that the higher charge of 20s. per annum for a wireless receiving licence permitting the reception of sound only, would apply as from June 1st. Holders of the present form of 10s. licence would not be required to pay the higher charge until their existing licences became due for renewal. The new forms of licence permitting the reception of television and sound, at a charge of £2 per annum, would also be introduced on June 1st.

The "Betatron"

Two Hundred Million Volt Acceleration of Electrons

LARGE grants in aid of nuclear research at the Universities of Manchester and Glasgow have recently been announced by the Department of Scientific and Industrial Research. One of the items of equipment to be acquired in this way is a "Betatron" which is to be built by the Metropolitan-Vickers Electrical Co., Ltd., for the use of Professor P. L. Dee of Glasgow University for accelerating electrons to high energy levels for the production of X-rays of great penetration. At the present time there are only two in this country; the smaller of them is of American manufacture, while the larger was built by Metropolitan-Vickers Co. for use in its own Research Department.

The Betatron equipment which Prof. Dee is to control has a magnet system weighing 130 tons, compared with the 3½ tons of the magnet of the existing "Metrovick" Betatron which is described as a 20 million volt apparatus, by which is meant that it accelerates the electrons to the same energy level as if a potential difference of 20 million volts were used so that the resulting velocity of the electrons is very near to the speed of light. The new model is described on the same basis of comparison as a 200 million volt apparatus.

Highly-Penetrative X-Rays

The electron acceleration is produced in a vacuum chamber called a "doughnut," situated between the magnet poles. During the process the electrons execute several hundred thousand revolutions in the "doughnut," travelling a distance of about 300 miles. A high vacuum must be maintained to prevent the electrons from colliding with stray atoms. At the end of the accelerating period the electrons are allowed to spiral outward on to a tungsten target and so generate a pulse of X-rays of high penetrating power. The most penetrating X-rays hitherto artificially produced in Britain by British apparatus were those from the St. Bartholomew's Hospital million volt tube, which was designed and built by the Metropolitan-Vickers Co.

The 200 million volt Betatron is not directly intended for the production of atomic energy, but at such high energies entirely new effects of vital significance in the study of nuclear problems will undoubtedly be observed. The existing "Metrovick" Betatron has a magnet built of 0·014 silicon steel laminations and is approximately 5 ft long by 3 ft high by 3 ft wide. The exciting current is provided by tuning its main coils to resonance at 150 cycles with a bank of condensers which handle more than 1,500 kVA and dissipate 6 kW of heat. The power required to maintain the circulating current (106 A at 700 V) is provided by a "Metrovick" frequency-tripling transformer, 50-cycle 3-phase, into which third harmonic distortion is introduced by saturation of the core. The 150-cycle current of 50 A at 700 V is drawn from secondary windings which are connected in open delta to remove the fundamental frequency.

The large output of X-rays obtained from the Betatron (equal to that of 3,000 grammes of radium) necessitates thick walls for the protection of those operating the apparatus, almost encircling the magnet. During operation the enclosure is completed by a wall of 18 in. thick barytes concrete bricks, moved up on a truck.

A.S.E.E. Prize Papers

THE three winning papers in the Association of Supervising Electrical Engineers' branch papers scheme were read at a meeting in London on Tuesday last. In the first-prize paper, "The Electrically Heated Autoplate," MR. G. H. PARKER (Manchester) described this machine for automatically casting the semi-cylindrical stereotype plates from which newspapers are printed and referred particularly to a gas heated plant converted by inserting specially designed tubular heating elements directly in the metal to be melted. A loading of 228 kW was employed to maintain continuously an output of 6½ tons of metal per hour.

The second-prize paper was "Metal Spraying and Some Applications" by Mr. G. A. ONION (Birmingham). This dealt with the use of metal spraying by the wire process in the maintenance engineer's workshop for the repair of worn parts. The deposit produced was not welded on to the metal of the article sprayed, but was merely an adherent coating composed of small particles of metal, each surrounded by a coating of oxide. It was stated that all types of metal could be sprayed, including steel, but that with some non-ferrous metals precautions were necessary to protect the operator from fumes.

In the third-prize paper, "Electrical Resistance Thermometers," MR. R. SNELL (Sheffield) explained the principles of thermo-couple and resistance types.

The Post Office in Wartime

THE first official account of the activities of the Post Office during the whole period of the war has been compiled by Ian Hay and has been published by the Stationery Office under the title of "The Post Office Went to War" (price 1s. 3d.). Written in a vivid style and copiously illustrated, the book gives an impressive picture of the extraordinary difficulties and new duties with which the Post Office organization had to deal — bombing. Army postal services, enormous increases in the telegraph and telephone demands, special communication services for the Forces, and preparations for the Normandy invasion. Reference is made to the destruction of the Central Telegraph Office and other incidents mentioned in the *Electrical Review* of May 11th, 1945 (page 669) and special tributes are paid to the work of the Post Office engineers and of the Dollis Hill Research Station.

COMMERCE and INDUSTRY

Contractors' Licences. More Porcelain Needed.

Registration of Contractors

WE are frequently asked questions about the registration of building and civil engineering contractors (including electrical contractors) by the Ministry of Works. Now the Ministry has issued a leaflet (P.I.40) explaining conditions for the granting of certificates of registration and giving information for the guidance of applicants. Copies are obtainable from the Ministry, Lambeth Bridge House, Albert Embankment, S.E.1.

Modern Housing

Some time ago the House-Building Industries' Standing Committee (82, New Cavendish Street, W.1) organized a national competition for builders who were asked to submit architect-designed plans for houses not exceeding 900 sq ft in superficial area. From the entries twenty-seven plans were selected and from these thirty pairs of demonstration houses have been built in various parts of the country and opened for inspection to the public and housing authorities. In a brochure which the Committee has published, at the price of 2s. 6d., drawings and specifications of eighteen of these houses are reproduced, forming a very useful guide to those who are interested in the subject of housing. Also embodied in the publication are articles by the constituent members of the Committee, including one on "Electric Service in the Home" from the British Electrical Development Association. Another section contains notes on the products of individual firms and there are also articles on various aspects of house building and choosing.

Substation Manufacture in Wales

What is claimed to be the first substation kiosk and equipment to be built completely in Wales has been constructed by South Wales Switchgear, Ltd., at its Treforest Trading Estate works. The substation, which is required for the Beddau South housing estate of the Caerphilly Urban District Council, was inspected recently at the works by the Council members and officials. The equipment includes a complete steel kiosk, 11-kV and 400-V switchgear and power transformer. All the designing and construction were carried out at the company's works and tooling has been completed for production in quantity both at Treforest and at the company's other works at Blackwood. Among many large contracts which the company has in hand is the main 11-kV switchgear for a new nylon factory at Pontypool.

The visitors were shown around the works by Mr. A. J. Nicholas, director and general manager, who said that some of the most able men in Britain had been brought to South Wales by the company and under their supervision local talent was being trained to fill important posts. Mr. Nicholas stressed the urgent need of adequate training being provided for apprentices, and said he had in operation a scheme by which 100 boys from secondary, elementary and technical schools were given training at the works. The boys were allowed a day a week to attend technical schools.

Scarcity of Porcelain Parts

Concern has been expressed by the Ministry of Supply at the delay in the housing programme which is being caused by the difficulty of obtaining sufficient porcelain parts for electrical fittings and appliances. The trouble is due to labour shortage and a committee has been set up in the Potteries to take all possible steps to remedy the situation. According to the *Manchester Guardian*, Colonel G. A. Wade, the chairman of this committee, said that to continue to meet the demand for fittings production would have to be doubled which meant that 2,500 more people were needed in the industry to supplement the work of the 5,000 already engaged in it. During a visit to one of the factories it was found that in one room only seventeen presses out of sixty were being operated owing to lack of labour. Colonel Wade said that conditions in the industry were good; training rates of 51s. 6d.

Caerphilly councillors and officials inspecting the first substation kiosk equipment to be made in Wales

were paid to learners who after about two months were able to earn in the region of £3 to £4 for a 47-hour week.

"Britain Can Make It" Exhibition

For choosing the best of the new post-war designs in heating, cooking and domestic power appliances, to be shown at the "Britain Can Make It" Exhibition in September, the following committee has been appointed by the Council: Mr. Joseph Emberton (architect), Mr. F. R. Yerbury (director of the Building Centre and vice-president of the Design and Industries Association), Mrs. A. R. Nilson (experimental kitchens section, Ministry of Food), Miss J. Edward (National Training College of Domestic Subjects), and Mr. R. A. Duncan (consultant to the British Coal Utilization Research Association). Mr. J. Beresford Evans, Council of Industrial Design, Tilbury House, Petty France, S.W.1, will act as secretary to the committee.

Old Cromptonians' Association

The Old Cromptonians' Association's annual dinner will be held at the Café Royal, Regent Street, W.1, on October 25th. Members are requested to forward their addresses, together with particulars of war service, to the hon. secretary, Mr. H. H. Spencer, Electra House, Victoria Embankment, W.C.2.

Supply Companies' Staffs

Brig.-General R. F. Legge, the president, took the chair at the annual meeting of the Association of Officers and Staff Members of Electricity (Power and Supply) Companies of Great Britain (A.O.E.C.) last week and submitted the Executive Committee's report and accounts. He stressed the fact that there was no need for the staffs of electricity supply companies, who were concerned with safeguarding their positions in the event of the introduction of a reorganization scheme, to become involved in political issues. General Legge said that the great merit of the A.O.E.C. was that it saw with a clear eye the specific purposes for which it existed and was ready and able to take immediate action if necessary.

Upon the proposal of Mr. J. J. Lesser, seconded by Mr. H. W. Cox, Brig.-General Legge was unanimously re-elected president and the other officers were also re-elected. A vote of thanks was accorded Mr. J. J. Gibbons for acting as secretary during the war.

Scrap Steel Prices

The Control of Iron and Steel (No. 49) (Scrap) Order, 1946 (S.R. & O. 1946 No. 659), withdraws from price control certain forms of steel scrap containing tungsten.

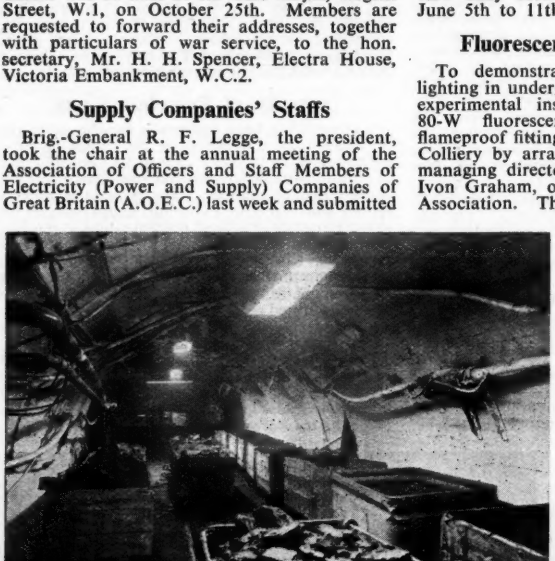
Disposal of Machine Tools

A further on-site sale will be opened by the Ministry of Supply at Rolls-Royce, Ltd., Eighty-One Factory, Lower Milehouse Lane, Newcastle-under-Lyme, Staffs, at 10 a.m. on May 29th, when about 600 machine tools will be available. Machines not sold by the afternoon of June 4th, will be sold by competitive tendering. Unsold machine tools will be on view daily between 10 a.m. and 4 p.m. from June 5th to 11th.

Fluorescent Lighting in Mines

To demonstrate the effect of fluorescent lighting in underground workings an interesting experimental installation of "Mazda" 5-ft. 80-W fluorescent lamps in "Mazdalux" flameproof fittings was made recently at Binley Colliery by arrangement with Mr. R. Brown, managing director of the colliery, and Mr. J. Ivon Graham, of the Mine Owners' Research Association. This is a naked light pit and therefore, flameproof fittings are not essential, although they were used for the fluorescent lighting.

The normal "C76876" flameproof fitting is not designed specifically for use in mines, but it is certified in respect of Group II gases (petroleum and acetone) for industrial use. Since the normal supply in collieries is 125 V, a two to one step-up transformer was provided. This arrangement did not comply with the existing Regulations for Lighting in Mines, but permission to make the installation under these conditions was obtained from the Ministry of Fuel and Power.



Fluorescent lighting at the Binley Colliery. Whitewashing of the walls greatly improves illumination on vertical planes

The average illumination obtained with the new lighting is higher, although the peak illumination under the fittings is not greatly altered. The distribution is greatly improved, particularly on the road between the tubs. The illumination immediately under the fittings on the horizontal plane level with the top of the

tubs is approximately 18 f.c. but mid-way between fittings it falls to approximately 2 f.c. Whitewashing of the walls has provided a striking demonstration of the improvement obtained by attention to the background as a part of the illumination scheme. The illumination on the horizontal plane is practically unaffected by the whitewashing, but the illumination of vertical planes is greatly increased and the whole effect on observers is one of improved illumination and more spacious appearance. The latter is a matter of considerable psychological importance in confined spaces, such as those in coal mines.

J.I.C. Conference

The National Joint Industrial Council for the Electricity Supply Industry will hold its conference at Bristol on June 20th and 21st. About forty delegates from England, Ireland, Scotland and Wales, including Sir William Walker, present chairman of the Council and ex-Lord Mayor of Manchester, and Sir Percival Bower, of Birmingham, will attend. There will be a civic welcome at Bristol Council House, a dinner given by the Electricity Committee at the Grand Hotel, and a lunch given by the District Council at the Royal Hotel.

Sussex Industries Exhibition

Among the exhibitors at the Sussex Industries Exhibition at Brighton which was opened by Lord Broadbridge, K.C.V.O., on Saturday last and closes to-morrow, are the following:—Automatic Telephone & Electric Co., Ltd. (private exchanges and sound amplifying equipment); Clements, Rowland & Cleminson (clothes-washing and dish-washing machines, etc.); Hoover, Ltd. (vacuum cleaners); Lee Products (Great Britain), Ltd. (radio apparatus); and Page & Miles, Ltd. (radio and electrical equipment).

Warning Against Dangerous Wiring

A warning concerning the amount of electrical installation work being done by semi-skilled and unskilled labour was voiced by Councillor S. Scott, chairman of the Electricity Committee, at a meeting of Dartford Borough Council on May 13th. Only the previous week, he said, his attention was drawn to a job which had been done in one of the Council's own houses quite obviously by an individual who did not possess even an elementary knowledge of electrical work. Councillor Scott added that he immediately disconnected the wiring as he was certain that a fatal accident would have occurred. Regulations existed and were observed by good contractors and operatives, but it was possible for an untrained individual to purchase material in the open market, extend an existing installation and so make a death trap out of what might have been a sound, workmanlike job. Only by the co-operation of the public as consumers could the existing regulations be made effective.

Display of Marconi Equipment

In connection with the International Conference on Radio Aids to Marine Navigation, Marconi's Wireless Telegraph Co., Ltd., arranged an exhibition of its products at the Exhibition Centre, Wardour Street, W.1, which closes to-day (Friday). Part of the display, details of which were given in our last issue, is shown in the accompanying photograph.

Some of the navigation aids in the display of Marconi apparatus held in London

City Life Lines

" City Life Lines " is the title of a documentary film which Squire Productions, Ltd., produced with the object of showing in an entertaining manner how the water, electricity, gas, transport, etc., services of a city are organized and operated. Shots of Battersea power station depict the generation of electricity, the utilization side being unfortunately confined only to lighting, transport and ironing. Obviously in a film of this type it is possible only to select certain applications, but it is unfortunate that all the credit for catering goes to gas.

Frozen Cooked Meals

Though at present confined to air catering, the introduction of frozen cooked foods by J. Lyons & Co., Ltd., will open up many attractive possibilities for the housewife when rationing ceases. For nearly three years the company has been experimenting with the perfection of pre-cooked frozen meals and for the past four months the British South American Airways Corporation has been serving regular meals of " Frood," as it has been styled, on its London-Brazil services. Practically every type of meal can be successfully dealt with by this new system which involves quick freezing to a low temperature and storage at 15 deg F. Food thus frozen will keep indefinitely at this temperature, can be stored in an ordinary refrigerator for about five days, and will remain in good condition for two days after exposure to ordinary atmospheric temperature.

The food is frozen into rectangular blocks, separately wrapped in protective transparent

film, and packed in fibre-board cartons in units of twelve meals. Including entree, vegetables and dessert, each carton weighs about 16 lb and occupies a space of 0·35 cu ft. For heating the food in the air the General Electric Co., Ltd., has designed a special cooker operating at about 350 deg F and weighing about 40 lb. It operates on a 12- or 24-V supply and has a loading of 750 W, though this will be increased on the new larger aircraft. Refrigeration apparatus is not normally necessary on the aircraft, but will be provided at the stopping places. The system has also application for long-distance buses and small sea-craft, and J. Lyons & Co., are already planning to employ this method of freezing and cooking food in their teashops.

Fluorescent Lighting at Victoria

Over the "Golden Arrow" Continental platform at Victoria Station, ninety-six "Osram" fluorescent tubes giving an intermediate white quality of light (i.e., midway between the "daylight" and "warm white" colours) have been arranged in two lines each covering 250 ft of platform. They are spaced 8 ft apart and mounted under a canopy 14 ft high. Each line comprises twenty-four units butted together to form a continuous run. Two standard 8 ft 6 in. tubes are used in each unit. This system gives even illumination, with minimum shadow, over the whole of the platform and is proving a great help to the railway staff and the customs officials. The new lighting gives four times the illumination which was obtained with the original lighting system; the total loading is 4½ kW.

The scheme was prepared by the Illuminating Engineering Department of the General Electric Co., Ltd., to the requirements of Mr. A. Cunnington, Southern Railway lighting engineer. The tubes, transformers and high-voltage wiring were installed by Claude-General Neon Lights, Ltd., and the low-voltage wiring by Southern Railway engineers.

Electrical Contracting at Coventry

At a recent meeting of the Coventry City Council a letter was read from the Coventry Branch of the Electrical Contractors' Association, expressing concern at the Corporation's intention of doing electrical contracting work. Councillor Payne (an electrical engineer himself) supported the private contractors' point of view. He maintained that it was unfair for the Corporation to enter this field, and asked the question, "Who is going to inspect the Corporation's work?" He moved the reference back of the recommendation, but this was defeated and the recommendation was approved.

Trade Announcements

The shareholding of British Insulated Callender's Cables, Ltd., in Electrical Components, Ltd., has been purchased by the managing director, Mr. H. S. Seccombe and his associates. Mr. Seccombe will continue as managing director, and the board will consist of Messrs. L. S. Seccombe, J. C. Seccombe and A. T. Haywood.

W. T. Henley's Telegraph Works Co., Ltd., have opened a store at 10, Albert Road, Middlesbrough (telephone: 43100) under the control of Mr. M. B. Wilson, Newcastle Branch, with Mr. Humble as the local representative.

As from May 27th the Hull address of the General Electric Co., Ltd., will be Magnet House, 57-59, Beverley Road, Hull (telephone: Central 36740).

To provide increased accommodation Merz & McLellan have recently moved their Indian office to 16, Lee Road, Calcutta.

The London office and Export Department of Howells (Electric Motors), Ltd., are now at 221, Seven Sisters Road, Finsbury Park, London, N.4 (telephone: Archway 2765).

The transfer of the London works of Westool, Ltd., to new premises in Co. Durham is now almost complete, and will come into full effect on June 1st, from which date all correspondence, goods and raw materials should be addressed to St. Helen's Auckland, Co. Durham (Telephone: West Auckland 317; Telegrams: Solenoid, West Auckland).

Metal Components, Ltd., are moving tomorrow to their former head office at Arundel Place, Eastern Road, Brighton (Telephone: Brighton 3307).

J. H. Tucker & Co., Ltd., have re-opened their London office and warehouse at 2, Newman Street, London, W.1 (Telephone: Museum 1756). The establishment will be under the managership of Mr. G. A. Ruff.

Annual Holidays

British Insulated Callender's Cables, Ltd., are closing their works for the receipt of goods as follows: Anchor Works, Leigh, July 6th to 13th; Prescot and Helsby Works, July 27th to August 5th; Willenhall Foundry, June 22nd to 29th. The Erith Works will not be closed as holidays will be staggered.

The works of Belling & Lee, Ltd., Cambridge Arterial Road, Enfield, will be shut for the annual holiday from June 21st to July 3rd.

Johnson, Matthey Exhibition

An exhibition of their products and activities is being arranged by Johnson, Matthey & Co., Ltd., at the Dorland Hall, Lower Regent Street, S.W.1, next month.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding makers of the following :—

"Metamec" clock.
"Jandown" toaster.
"Hanco" fire.
"Hotap" water heater.

Illuminating Engineering

Proceedings at the First I.E.S. Convention

THE three-day convention of the Illuminating Engineering Society in London last week was a landmark in the Society's history. It was the first occasion on which anything of the kind had been attempted; and it presented a good opportunity of putting the Society " on the map," especially as regards those whose aid and sympathy would be mutually helpful.

The proceedings,as outlined in the *Electrical Review* of May 10th, commenced with an evening reception by the president (MR. H. C. WESTON) and Mrs. Weston, during which tea was served, being followed by four half-hour popular talks in the I.E.E. theatre under the chairmanship of MR. HOWARD LONG, senior vice-president.

MR. R. A. ESHELBY'S subject was " Lighting in Captivity," a commentary on his experiences while a prisoner of war in Germany with a description of the way in which a theatre was furnished and stage lighting fittings were improvised entirely from the wrappings of Red Cross packages received in the camp.

Invasion Lighting

MR. CRAWFORD SUGG followed with " Some Light on Invasion," being brief outlines of decoy lighting to deceive enemy aircraft at night, the use of mobile equipment for establishing advanced airfields, illumination of invasion beaches and the port of Antwerp immediately after its capture, the unorthodox methods employed often being dictated by the necessity to utilize whatever materials happened to be available in the absence of special equipment.

MR. H. R. RUFF then mentioned " Some Uses of Black Light," such as medical diagnosis and crack detection in non-magnetic materials. He demonstrated its utility for identifying salts, chemical titration, invisible laundry marking and the remarkable intensification of colours, as well as the effects of perspective in commercial decorative work and on theatre stages.

MR. J. S. PRESTON'S " Conjuring with Colours " by manipulation of the optically projected spectrum demonstrated the combination of light rays and meaning of complementary colours, differentiating between the subtractive mixing of paints and liquid dyes and the additive recombination of coloured light.

The annual general meeting was brief and formal. Some 266 new members were elected last year, raising the total to 1,853. The satisfactory financial position had encouraged the holding of this first Convention to inaugurate a period of progress expected from the opportunities which the immediate future would offer.

Presentation

There had not been any independent nominations for filling the vacancies caused by retiring members of Council and the Society had to yield to MR. J. S. DOW'S desire to retire next October from the honorary secretaryship, which he has held since 1928. Mr. Dow has been associated with the Society from its foundation in 1909 and he has been present at every meeting of the Council during the past thirty-seven years. To mark the esteem and appreciation of the officers and members, Mr. Dow was presented with an illuminated address, a watch, clock, book, leather case and a cheque. He is now president-elect.

After the business meeting MR. PERCY GOOD recalled some of the war-time activities of the Society, he having been instrumental in bringing it into close contact with the Ministry of Home Security under whose *ægis* various joint committees on which members of the Society served dealt with numerous special problems of emergency lighting.

So far as the future was concerned, he urged the I.E.S. to make its own opportunities. Vulgar displays of light must be avoided, for they were damaging. They must see to it that artificial light was used in proper ways; he purposely avoided using the words economically and efficiently, because they needed defining and something more than mere economy was needed. For instance, the rigid rules of street lighting might be relaxed in order to enhance the appearance and comfort effects so as to make people feel at home in the streets; also some decorative illumination in public parks and open spaces would be beneficial. Upon inquiry why the floodlighting of the dome of St. Paul's Cathedral had ceased, he was

told by the church authorities that it was abandoned because it did not "attract crowds." That kind of thing must be destroyed so as to encourage amenity lighting rather than simple scientific illumination.

Social Events

Six more addresses (which were summarized last week) were delivered at subsequent afternoon and morning sessions under the chairmanship of SIR CHARLES DARWIN (director, N.P.L.), the EARL OF MOUNT EDGCUMBE and MR. ALISTER MACDONALD, chairman of the R.I.B.A. Architectural Science Board.

Meanwhile Mr. H. C. Weston (president) entertained leading representatives of the twelve I.E.S. centres and five groups at a mid-week luncheon at the Trocadero Restaurant and presided again on the same day at a dinner-dance at the Connaught Rooms attended by about 380 members and guests with their ladies.

MR. GEORGE TOMLINSON (Minister of Works) was the principal guest and in proposing the toast of the Illuminating Engineering Society remarked upon the need for co-operation to foster public appreciation of the need for better light. As an ex-weaver in the Lancashire cotton trade he knew something about the effect on the eyes of trying to do delicate work in insufficiently lighted sheds. He thought it was necessary that there should be regulations to ensure the provision of proper lighting in a good many places.

MR. WESTON responded with an expression of gratitude that the I.E.S. had been ready to make recommendations when needed and, also, that they had been put into effect when required by the circumstances of war. It would not be lacking in the provision of standards that might be needed by the Lighting of Buildings Committee, which was set up last year. It was encouraging that the Ministry of Works offered in its resettlement schemes a course on lighting, for the true gain from light was neither small nor merely monetary; it was the joy of sight and pleasure of visual experience.

DR. C. C. PATERSON welcomed the guests, including senior representatives of the Ministry of Works, Factory Inspectorate, Building Research Station, British Standards Institution, the architectural and medical professions (being encouraged to hope that the intimacy between the I.E.S. and medical profession would continue to grow), as well as representatives of the gas and electricity industries, with special mention of the presence of Dr. N. A. Halbertsma (president, International Commission on Illumination) from Holland.

PROF. E. N. DA C. ANDRADE responded on behalf of the guests.

The programme included a visit by motor coaches to Hampton Court Palace, a trip down the River Thames to the London docks, and a burlesque pageant entitled "Lighting through the Ages" staged at Magnet House. The Convention concluded with a tour of the Illumination and Photometry Section (under the guidance of DR. J. W. T. WALSH) of the National Physical Laboratory.

The Exhibition

A collection of special types of lamps and equipment exemplifying many unusual applications of light during the war period, displayed in the Lighting Service Bureau throughout the Convention, demonstrated the variety and width of the scope of the wartime activities of the Illuminating Engineering Society.

Most of the thirty-nine displays, each composed of several items, were staged by the Navy, Army, R.A.F., N.P.L. and other Government Departments. Other exhibits were anonymous because the co-operative effort of the lighting industry makes it difficult to apportion the credit for wartime developments to particular manufacturers, or research organizations.

Importance of Export Trade

A CLEAR and readable exposition of the factors which enter into our overseas trade is provided by a booklet entitled "Exports" which has been produced by the Export Committee of the British Engineers' Association (32, Victoria Street, S.W.1). The first part deals step by step with the nature of our imports and exports and shows how, since 1929, "invisible" exports have been insufficient to balance our purchases from abroad, an inequilibrium that has had to be met by disposing of gold or overseas investments. In this way the imperative need for greater export trade is stressed, particularly in post-war conditions. The meaning of the Bretton Woods Agreement and the proposed American loan is explained.

After reiterating the oft-repeated statement that our export volume must be expanded to 75 per cent above the 1938 level, detailed advice is given (in Part II) on methods of entering and maintaining export business. Such matters as the pricing of goods for export, overseas representation and other sales methods, procedure, advertising, Government services and the British Export Trade Research Organization are set out. Part III of the booklet is a useful statistical appendix.

ELECTRICITY SUPPLY

New Kingston Station. Wessex Rural Extension Plans.

Barrow-in-Furness.—HYDRO-ELECTRIC PLANT.—At a meeting of the Corporation Development Committee it was reported that Mr. F. Anderson, M.P. for Whitehaven, was calling a conference in connection with the proposed hydro-electric power plant at Duddon estuary.

Bedford. — SUPPLY IMPROVEMENTS. — The Electricity Committee is to reinforce the supply in the Queen's Park district at a cost of £1,454, provide a supply to Biddenham (£3,900) and strengthen the supply to Kempston (£3,060).

Borrowdale.—ELECTRICITY AND AMENITIES.—The Parish Council, supported by Cockermouth Rural District Council and West Cumberland Development Council, is asking the Government to override any opposition by protective societies to the installation of electricity in the area.

Camberwell.—FREEDOM OF CHOICE.—The Housing Committee has agreed that whilst dwellings are being constructed on the Denmark Hill estate the South Metropolitan Gas Co. and the County of London Electric Supply Co. shall install the necessary services so that tenants may choose whichever method of heating and cooking they desire.

Carlisle.—FINANCING EXTENSIONS.—In the case of many applications for supplies the capital expenditure involved necessitates a substantial contribution by the applicant towards the cost. On the recommendation of the electrical engineer the Electricity Committee has agreed to afford facilities for the payment of this contribution by quarterly instalments over a period of five years on a 3 per cent basis.

Dover.—VOLTAGE STANDARDIZATION.—Application is being made to the Electricity Commissioners for permission to change the voltage to the 240-V standard.

Droitwich.—ELECTRICITY REPLACES GAS.—The S.W. & S. Electric Power Co. has received instructions from the Droitwich Town Council to convert 192 street lights in the borough from gas to electricity, and to install electric street lighting on the new Council estate at Stalls Farm. This is a result of a unanimous decision of the General Purposes Committee to adopt the scheme to change the street lighting throughout the borough from gas to electricity, after consideration of competitive tenders submitted by the S.W. & S. Company and the Droitwich Borough Gas Department. The conversion of the existing standards is to commence as soon as the supplies of material permit, and it is planned to complete the scheme by September, 1947.

Eastbourne.—INCREASING DEMAND.—With the population of the town rapidly approaching its pre-war figure, with new all-electric housing estates being erected, and now that many hotels, de-requisitioned by the Services, are being reconditioned and equipped with modern electrical appliances, the demand for a supply of electricity is increasing considerably. As a result much extension work and reinforcement of the distribution system has been called for to keep pace with this demand. Recent extensions (estimated cost £9,873) approved by the Electricity Committee include the following: Burlington Hotel (£1,090), Gaudick Road (£420), Victoria Drive (£2,790), Carlisle Road (£1,140), the Pier (£1,145), Parkcroft housing estate (£293), South Road housing estate (£336) and Lawrence House, for the Admiralty (£2,089).

Application has been made to the Electricity Commissioners for sanction to borrow £10,000 for the purchase of consumers' domestic apparatus, £10,000 for mains and services, and £5,000 for substation equipment.

FILMS.—Some months ago the film "Their Invisible Inheritance" with a supporting programme was exhibited in the showrooms with considerable success, and now more recently three other E.D.A. films, admirably produced and executed, were shown each afternoon for a week to capacity audiences. From inquiries received and remarks made after each showing it seems certain that this form of publicity is a sure success.

Glasgow.—LAUNDRY PLANT.—It is recommended that electric washing machines and hydro-extractors shall be installed at washhouses at estimated cost of £13,100.

Gravesend.—DOMESTIC EQUIPMENT IN COUNCIL HOUSES.—The 132 Council houses built under the 1920 scheme, which had no hot-water system installed, are to be provided with electric water-heaters. They will also have two power plug points. The Council has also decided that instead of a back of the fire boiler being fitted in new permanent houses an electric water heater shall be installed in all houses. Of these latter houses, 85 per cent will have electric cookers and 15 per cent will have gas.

Grimsby.—HIRE CHARGES.—New wash boilers are to be hired at 4s. 6d. a quarter (pre-war 3s.) and immersion heaters at 5s. without wiring, or 8s. with wiring when the labour and material position permits (pre-war, 5s. including wiring). Cookers will be supplied on hire-purchase on a ten-year basis.

Islington.—1944-45 ACCOUNTS.—The annual accounts of the electricity undertaking for 1944-45 show a net surplus of £11,780 compared with £2,573 in the previous year, the total revenue being £512,010 (£494,647). Sales aggregated 67·3 million kWh (66 million) at an average price of 1·97d. (1·96d.) per kWh sold.

DOMESTIC APPARATUS.—The Electricity Committee is to purchase 550 cookers at a cost of £8,332 and 550 kettles (£1,084) for the housing schemes.

Kingston-on-Thames. — NEW GENERATING STATION.—The ceremony of laying the foundation stones of the Corporation's new 120,000-kW generating station at Down Hall Road was performed on Wednesday last week by the Mayor, Mr. F. C. Digby, J.P., and the chairman of the Electricity Committee, Alderman W. G. Eggleton. Sir Harry Brand, chairman of Charles Brand & Son, Ltd., the main civil engineering contractors, presided. After the laying of the stones the Rev. H. E. Stickler, the Mayor's chaplain, offered a dedicatory prayer

and a vote of thanks to the Mayor and chairman of the Electricity Committee was proposed by Mr. J. H. Rider, of Preece, Cardew & Rider, the consulting engineers. The borough electrical engineer, Mr. E. J. Jarvis, expects the first section of the plant comprising three 260,000 lb per hr Stirling boilers and two 30,000-kW B.T.H. turbo-generators with a 3,000-kW house set will be in service for the winter of 1947-48. Three similar boilers and two more 30,000-kW sets are scheduled for service for the winter of 1949-50. The main switchgear is being supplied by Ferguson, Pailin Ltd., and the auxiliary switchgear by the English Electric Co., Ltd., and Contactor Switchgear, Ltd. Stewarts & Lloyds, Ltd., are responsible for the pipework.

The Mayor laying one of the foundation stones of the new Kingston-on-Thames power station. On the left are Mr. E. J. Jarvis, Mr. A. W. Forsdike and the Rev. H. E. Stickler. Sir Harry Brand, Alderman W. G. Eggleton and Councillor E. R. Canham are on the right

Nelson.—POWER COSTS.—The Town Council has authorized increases in the electricity tariff for large power users in view of the revised scale adopted by the Central Electricity Board.

Scarborough.—LOANS.—The Electricity Committee is seeking sanction to borrow £12,958 for supplying electricity to housing estates, £20,000 for mains and services and £9,647 for substations.

Stalybridge.—LIGHTING IMPROVEMENTS.—The Corporation Lighting Committee has approved an estimate of £2,508 by the Stalybridge, Hyde, Mossley and Dukinfield Joint Transport and Electricity Board for lighting improvements in Mottram Road and has asked the borough engineer to prepare a scheme for improved lighting by sodium lamps in the vicinity of Thompson Cross.

Torquay.—DOMESTIC EQUIPMENT.—A quotation submitted by the Electricity Department for the hire of electric cookers, kettles and washboilers to houses on the Watcombe estate has been accepted by the Housing Committee. The tenants are to pay 1s a week.

Wakefield.—INCREASED HIRE CHARGES.—The Electricity Committee has increased the quarterly charges for the hire of new domestic electrical apparatus by 50 per cent on pre-war charges.

Wessex.—COMPANY'S £3,000,000 SCHEME.—We are informed by the Wessex Electricity Co. that it has plans in hand for taking electricity to a further 840 remote villages and hamlets at a cost of £3,000,000. Work has already started on supply lines to serve the first hundred. This is a continuation of development stopped by the war. Already electricity is available to 80 per cent of premises in the company's 4,300 sq mile territory.

Overseas

Belgium. — POWER DEVELOPMENTS. — Some interesting facts about the electric power industry in Belgium were given at a recent annual meeting held in Brussels of the Compagnie Générale d'Entreprises Electriques et Industrielles "Electrobel," one of the large Belgian holding concerns. Among the various affiliated undertakings specially referred to was the Société d'Electricité de l'Escaut whose plants suffered only slight damage during the war and whose sales of power during 1945 showed an increase of 12 per cent over the preceding year. In order to provide for the steady increase in demand, contracts have been placed for two new 15,000-kW sets for the power station at Merxem. The generating plants of the Société des Centrales Electriques des Flandres et du Brabant were badly damaged during the military operations. The work of reconditioning them is well in hand, and for the power station at Langebrugge a new 25,000-kW steam turbine and the necessary boilers have been ordered. The Société Intercommunale Belge d'Electricité has ordered a new 50,000-kW turbo-alternator set, together with the necessary boilers, for the power station at Monceau, which, when this is completed, will have a capacity of 100,000 kW. For the power station of the Société Générale Belge de Production d'Electricité (Interescaut) at Schelle a new 50,000-kW set has been ordered which will bring the capacity of the plant up to 200,000 kW.

Electricity Generated in April

OFFICIAL returns rendered to the Electricity Commissioners show that 3,058 million kWh was generated (2,882 million kWh sent out) by authorized undertakings in Great Britain during April, 1946, as compared with 2,926 million kWh in the corresponding month of 1945, representing an increase of 132 million kWh or 4·5 per cent.

During the first four months of 1946 the total amount of electricity generated was 14,482 million kWh (13,679 million kWh sent out) as compared with 13,782 million kWh for the corresponding period of 1945, representing an increase of 700 million kWh or 5·1 per cent.

Earthing Installations

AT last month's informal meeting of the Institution of Electrical Engineers a discussion on the earthing of low-voltage heavy-current installations was opened by MR. H. W. SWANN (Factory Inspectorate) who remarked upon the number of domestic fatalities due to the use of unearthed portable radiators in bathrooms. His view was that the measurement of leakage did not receive the attention it merited. There were leakages of over 50 A on some d.c. installations now in service and the use of recorders would probably show that some a.c. systems were little better.

A note to No. 1,006 of the I.E.E. Regulations for the Electrical Equipment of Buildings permitted the maximum earth leakage current to be computed, if so desired, on the assumption that the circuit contained only the "consumer's earth resistance." That assumption was necessarily incorrect because it included only part of the loop which fault current must traverse on its way back to the neutral point at the sub-station or generating plant. Mr. Swann strongly advocated measuring the resistance of the complete loop, because a fatality had resulted from the presence of 10 ohms in the supply undertaking's neutral earth connection. He hoped that suitable measuring apparatus would be developed for that purpose.

He hoped, too, that electricity undertakings would assume responsibility for the provision of satisfactory earthing connections on consumers' premises, so obviating the necessity to utilize water mains for that purpose, since some pipes were non-conducting, being made of asbestos-cement composition. The E.R.A. had carried out tests in the Rochdale and Manchester areas and the Electricity Commissioners had the matter under consideration.

Undertaking-Consumer Connection

There was considerable support in the subsequent general discussion for the provision of a satisfactory metallic connection between the electricity supply undertaking's neutral and the consumer's installation. It was appreciated that there were certain legal difficulties regarding the provision of such a connection, but it was considered that the importance of the matter warranted an effort being made to overcome the difficulties, including that of responsibility if trouble were experienced when the undertaker's cable sheath was used as an earth return.

In summing up, Mr. Swann pointed out that it was the difficulty of obtaining satisfactory earth connections in rural areas which in many cases justified the cost of the provision of earth-leakage circuit-breakers. Voltage type breakers should only be used as a supplement to and should not be considered an adequate substitute for earthing. He noted that there had been general support for a metallic loop earth return circuit, but agreed that in certain cases the undertaking might meet technical difficulties.

Resistance-Welder Rating

STANDARDIZED methods of rating resistance-welding machines, designed to assist users and electricity supply authorities in assessing their capacity in relation to their duties and demand upon distribution systems, have been prepared by a technical committee of the Resistance Welding Machine Section of the British Electrical & Allied Manufacturers' Association. In addition to the customary data (such as name of manufacturer and serial number), the *minimum* information shown on nameplates of spot and seam welders made by B.E.A.M.A. members is:—Nominal kVA (50 per cent of short-circuit primary kVA on top tapping); primary voltage; primary current (short-circuit primary amperes on top tapping). The secondary amperes and the minimum duty cycle of the machine will be quoted to the user although this information need not be stated on the nameplate.

For projection welders similar information will be given on nameplates, but since there are no short-circuit conditions, the short-circuit primary kVA is measured with a solid steel block or section inserted between the platens, being equivalent to the total added thickness of the job for which the machine is designed, and having an area equivalent to the sum of the areas at the bases of the designed maximum number and size of projections. The nameplates of flush-butt and butt-welders will show the maximum kVA on top tapping, when the machine is set up for welding a stated maximum area of steel stock, as well as the primary voltage of the machine.

Traction Control

CONTROL equipment for "motor coach" trains on British railways is described in a paper by MR. B. J. PRIGMORE submitted to the London Students' Section of the Institution of Electrical Engineers.

The author first outlines the principles on which constant acceleration is achieved when starting, which necessitates the exertion of constant torque by the d.c. motors, thus demanding the maintenance of constant current during the accelerating period. The most usual form of connection for series-parallel transition is of the "bridge" type, effected by means of drum or cam-operated controllers, with current relays operating electro-magnetic contactors for automatic notching.

Actual equipments described include those used on the Liverpool to Southport lines of the Lancashire and Yorkshire railway, the Mersey tunnel railway, the L.M. & S.R. (north London) lines, the S.R. (south London) trains and the London tube and District lines. The paper concludes with consideration of the "Metadyne" system, an arrangement which affords truly constant-current acceleration without the use of resistances.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Automatic Telephone & Electric Co., Ltd.—Referring to the activities of subsidiary companies in his statement circulated with the annual accounts, Sir Alexander Roger (chairman) says that domestic electrical goods have a high priority and Elexcel, Ltd., has a substantial order book; a programme of capital expansion is being embarked upon to give the company increased capacity in this growing market. Arrangements are being made for the extension of the laboratory facilities of Hivac, Ltd. (which was acquired during the war) so as to provide the thermionic technique so vital for progress in the widening field of telecommunications. An interest was acquired last year in the Pioneer Telephone Manufacturing Co., Ltd., whose factory at Manchester is engaged in the manufacture of intercommunication telephones, and two internal telephone rental companies have also been acquired, namely, the Pioneer Private Telephone Co., Ltd., and Internal Telephone Services, Ltd. The Automatica Electrica Portuguesa has been established in Portugal to cater for the demand for local manufacture. The International Automatic Telephone Co., Ltd., is not at present operating.

On the question of conscription, the chairman urges that more consideration should be given to industry in its task of reconversion and its vital need of specialists. He states that owing to the present method of recruitment to the Forces and rate of demobilization the company has nearly as many employees actually serving as was the case a year ago. With regard to education, a department has been established which is exclusively concerned with training and through which every new employee will pass. Another research department has also been established to deal with new elements in the field of telephony and telegraphy.

Recalling that London had held the proud position of telecommunications centre of the world, the chairman says that it is now proposed to disintegrate this great network of British communications and he expresses the hope that before the nationalization of Cable & Wireless, Ltd., is consummated the Government will take into the fullest consideration the international political issues which are certain to arise.

Newman Industries, Ltd., record a profit for 1945 of £82,608, compared with £82,652 for the preceding year, of which taxation absorbs £51,981 (£52,250). A final ordinary dividend of 12½ per cent is recommended, together with a bonus of 2½ per cent, making 22½ per cent for the year (same). A sum of £2,326 (nil) is provided for repayment of E.P.T. paid by a subsidiary, and £22,620 (£20,366) is carried forward.

Pressed Steel Co., Ltd.—Owing to the reduced volume of output through the cancellation of Government munition contracts the trading profit fell from £731,520 in 1944 to £92,377 in 1945, after providing £133,164 (£140,921) for depreciation, etc. A sum of £485,000 (nil) is credited from E.P.T. recoverable—a further large sum is expected to be recovered at the end of 1946—and £100,000 (same) is reserved for deferred repairs, contingencies and post-war reorganization of plant. The net profit is £172,515 (£195,005) and the ordinary dividend is unchanged at 27½ per cent, leaving £516,063 (£479,433) to be carried forward. The chairman states that the company quickly overcame the reconversion problem but has since been hampered by labour shortage. The order book is full.

Callender's Trust, Ltd.—The accounts for the year ended March 31st show a revenue of £38,803 (£34,479), after deduction of tax. Management expenses, directors' fees and N.D.C. take £6,755 (£2,904), a sum of £2,271 (nil) is applied in writing off the cost of furniture, fittings, etc., and £13,250 (£8,000) goes to reserve for dividends or contingencies. The dividend for the year is again 5 per cent and £100,021 (£97,932) is carried forward. Since June 29th the Trust has been operating as an independent company bearing the full cost of its own administration and staff.

Enfield Cables, Ltd., in its accounts for 1945, shows a profit, including interest and dividends on investments, of £170,252 (against £214,815 for 1944). The net profit amounted to £115,034 (against £115,894 for 1944), after providing £19,000 (£53,161) for taxation reserve. As already announced, the ordinary dividend for the year is unchanged at 12½ per cent, leaving £16,304 (£16,270) to be carried forward. The chairman states that orders in hand are greater than in any pre-war year, but costs are rising and the company is faced with a programme of heavy expenditure to permit the supply of cables now in demand. He forecasts a continuance of the lower rate of earning in 1946 and 1947, and says that even the past year's figure may not be reached.

Enfield Rolling Mills, Ltd.—The accounts for 1945 show a net profit of £23,692 (against £12,399), from which the dividend is maintained at 5 per cent and £129,749 (£121,457) is carried forward. The report impresses the board's opinion that the reopening of the London Metal Exchange at the earliest time is of paramount importance.

Lacrinoid Products, Ltd.—The net trading profit for 1945, including interest and transfer fees, was £18,988 (against £53,855 for 1944). After deducting expenses and £8,125 (£47,000) for taxation, there was a net profit of £9,350 (£5,522). It is proposed to pay a dividend of 10 per cent (against 9 per cent), leaving £4,327 (£2,633) to be carried forward.

The Rheostatic Co., Ltd., by a final payment of 8 per cent, is maintaining the year's distribution on the ordinary shares at 12 per cent. The net profit was £9,425 (£9,730).

Simms Motor Units, Ltd.—To a net profit of £49,347 (£122,830) is added £25,901 from sundry provisions in previous years not required. A sum of £61,500 (£105,500) is provided for taxation on the 1945 profits and amounts

brought to credit. The dividend of 10 per cent recommended on the ordinary shares is the same as last year but on increased capital, and the balance carried forward is £17,839 (£21,591). A further reserve of £37,464 has been created for development and re-equipment, this being the amount of the agreed E.P.T. refund to the end of 1944.

Johnson & Phillips, Ltd., show a fall in profits from £458,296 for 1944 to £313,008 last year. Tax provision amounts to £58,000 (against £180,000 for 1944), with A.R.P. expenditure at £824 (£20,698), and the net profit is £162,821 (£180,325). Besides £84,432 brought in, £36,072 is credited from debenture sinking fund reserve no longer required. The dividend for the year is maintained at 15 per cent by a final payment of 7½ per cent, £107,500 (£105,000) is set aside for reserves and £112,825 is carried forward.

The Marconi International Marine Communication Co., Ltd., records a net profit for 1945 of £90,925 (after allowing £71,000 for taxation) compared with £90,138 for 1944 (after providing £159,000 for E.P.T. and contingencies and £31,000 for income tax). The dividend is unchanged at 7½ per cent and £36,526 (£35,055) is carried forward. It is stated that reconversion has proceeded rapidly during the past six months and orders are now being received at a record rate.

G. & J. Weir, Ltd., report a trading profit for 1945, together with balances on royalties and investment revenue accounts, of £335,570 (against £500,537 for 1944), of which taxation absorbs £122,469 (£281,417). There is this year no allocation to general reserve (last year £300,000). It is proposed to pay a final dividend of 19 per cent less tax on capital as increased last January, following an interim dividend of 15 per cent tax free. Last year both dividends were 15 per cent tax free. The carry-forward is £245,051 (£156,255).

Singapore Traction Co., Ltd.—Control of the undertaking in Singapore was restored to the company on September 11th last and an operating profit of £447 for the period from September 16th to 30th has been brought into the accounts for 1944-45 which show a loss of £15,655 (against £8,702). At September 30th the total deficit, including £50,000 estimated tax provision, was £114,861 and after transferring £66,967 from reserves there was a debit balance of £47,894. It is stated that from October to the end of February last the operating profit amounted to about £20,000.

The Rawlplug Co., Ltd., in its accounts for 1945, shows a net profit of £66,455 (against £65,830). It is proposed to pay a final ordinary dividend of 30 per cent, again making 40 per cent for the year.

Meters, Ltd., propose to pay an ordinary dividend of 10 per cent (same). The net profit for the year to March 31st last was £13,976, against £28,126 for 1944-45.

British Oxygen Co., Ltd.—Surveying the future prospects of the company at its annual meeting, the chairman (Mr. S. J. L. Hardie) said that no industry could stand still, and, in their overseas associated companies they had accordingly decided to develop three new areas, but it was too early yet to forecast the nature or location of these developments. Since the termination of the war, they had co-ordinated their research department under their director of research with a large staff of chemists, physicists and engineers who would devote their whole time to research. They had in hand a wide programme for expansion of their research activities in the low temperature field and the heavy chemicals allied to their industry. They had set aside one of their works for this purpose and were at present laying out the most modern research laboratories with accommodation and facilities for large-scale tests of pilot plants.

The West London and Provincial Electric and General Trust, Ltd., records a net profit for the year to March 31st last of £13,091 (against £12,836). The ordinary dividend is maintained at 6 per cent by a final payment of 4 per cent and £4,280 (£4,034) is carried forward. Investments stand in the balance sheet at £633,473 (£623,155) and the valuation at March 31st shows an appreciation of £102,198 (£48,270).

The Electrical Finance & Securities Co., Ltd., is recommending a final dividend of 6 per cent and a bonus of 5 per cent, making with the interim dividend a total distribution of 15 per cent for the year (against 13½ per cent). The accounts show a balance on profit and loss of £50,642 (£43,464) and £110,708 (£95,591) is carried forward.

The River Plate Electricity and Other Securities Corporation, Ltd., out of a net profit of £37,027 for the year ended April 15th (against £32,078 for 1944-45) is paying a final dividend of 6 per cent, making 8 per cent for the year (same). A sum of £10,000 (£5,000) is allocated to reserve and £17,230 (£18,663) is carried forward.

The London Electric Wire Co. & Smiths, Ltd., with a final dividend of 5½ per cent, is maintaining the total distribution for the year at 7½ per cent.

Ransomes, Sims & Jefferies, Ltd., propose to obtain further capital by the issue of 250,000 £1 ordinary shares for which Treasury sanction is being sought.

R. A. Lister & Co., Ltd., have declared an interim dividend of 5 per cent, the same as last year.

Veritys, Ltd., are paying a first and final dividend of 7½ per cent (unchanged).

New Companies

E.M.I. Engineering Development, Ltd.—Private company. Registered May 7th. Capital, £100. Objects: To carry on the business of commercial, industrial, technical and scientific designers, electrical and mechanical engineers, manufacturers of radio sets, etc. The directors will be appointed by Electrical & Musical Industries, Ltd., who may also appoint the governing director. Solicitors: Herbert Smith & Co., 62, London Wall, E.C.2.

E. M. I. Studios, Ltd.—Private company. Registered May 4th. Capital, £100. Objects: To carry on the business of recording by mechanical, electrical or other means, sound, vision and other records, etc. Solicitor: Samuel Soames, 62, London Wall, E.C.2.

Wheeler & Walters, Ltd.—Private company. Registered May 2nd. Capital, £5,000. Objects: To carry on the business of electrical engineers

and contractors, manufacturers and repairers of, and dealers in, dynamos, motors, armatures, etc. Directors: F. H. Wheeler, Flat 45, 55, Park Lane, W.1, and four others. Registered office: Wharncliffe House, Bank Street, Sheffield, 1.

Sefton Equipment Co., Ltd.—Private company. Registered May 2nd. Capital, £1,000. Objects: To carry on the business of manufacturers, designers, wholesalers, factors and distributors of all classes of electrical switchgear, appliances, lamps, luminous tubes, etc. Directors: F. L. Bampton, 5, Gladstone Grove, Heaton Moor; and G. Lanham, 60, Beaumont Road, Chiswick, W.4. Registered office: 23, Silver Street, Manchester, 1.

Great North (Electrical Manufacturing) Co., Ltd.—Private company. Registered April 27th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical and radio apparatus, etc. Subscribers: Eleanor A. Vincent, Byculla, East End Road, E. Finchley, N.2, and Betty Kesselman, 77, Audley Road, Hendon, N.W.4. Solicitors: Arbied & Co., 63-5, Piccadilly, W.1.

Electrical Controls & Services, Ltd.—Private company. Registered April 18th. Capital, £200. Objects: To carry on the business of electrical engineers, manufacturers of, and dealers in, all kinds of electrical switchgear, etc. Directors: R. Lowe, Ferry House, Laleham Reach, Chertsey, Surrey; and W. O. Jackson, 54, Monks Avenue, New Barnet (director of Viscolite, Ltd.) Registered office: Ferry House, Laleham Reach, Chertsey, Surrey.

Costello Cooker (Patents), Ltd.—Private company. Registered April 18th. Capital, £100. Objects: To acquire patents and to carry on the business of mechanical, gas, electric light and electrical engineers, manufacturers of, and dealers in, electric cookers, etc. Directors: J. C. Costello, Gayfere House, Great Peter Street, S.W.1; and J. D. Clark, 23, Woodside House, Woodside, Wimbledon, S.W.19. Registered office: 10, Lower Grosvenor Place, S.W.1.

Nortic Electrical & Mechanical Engineering Co., Ltd.—Private company. Registered April 17th. Capital, £1,000. Objects: To carry on business as indicated by the title. Directors: Angel Citron and Mrs. Doris Citron, both of 40, Gibwood Road, Northenden, Manchester. Registered office: 53, Deansgate, Manchester.

George E. E. Millest, Ltd.—Private company. Registered April 17th. Capital, £2,000. Objects: To carry on business as electricians, radio and electrical engineers, experts and contractors, etc. Subscribers: G. E. E. Millest and Mrs. Daisy Millest, both of 148, Watford Road, Croxley Green, Herts. R. E. Millest is the first director. Registered office: 148, Watford Road, Croxley Green, Herts.

Rogers, Smith & Horner, Ltd.—Private company. Registered April 18th. Capital, £3,000. Objects: To acquire the businesses (1) of an electrical element manufacturer carried on by C. N. Rogers as "The Elements Winding Co." at 307, St. Saviours Road, Leicester, and (2) of hosiery machine repairers carried on by R. E. Smith and J. S. Horner as "H. & S. Specialities" at 28, Nansen Road, Leicester. Directors: C. N. Rogers, Rothwell House, Station Road, Thurnby, near Leicester, A. G. Rogers, R. E. Smith and J. S. Horner. Registered office: 65, London Road, Leicester.

Worsley Simpson, Ltd.—Private company. Registered April 18th. Capital, £1,000. Objects: To carry on the business of electrical engineers and general electrical installation contractors, etc. Directors: Worsley Simpson, 226, Toller Lane, Bradford, and J. Wellock, 40, Duchy Drive, Heaton, Bradford. Registered office: 226, Toller Lane, Bradford.

C. & C. Products, Ltd.—Private company. Registered April 24th. Capital, £2,000. Objects: To carry on the business of manufacturers, maintenance contractors, representatives of manufacturers and wholesale and retail dealers in neon advertising and lighting signs, general lighting equipment, electrical apparatus and supplies, etc. Directors: F. Coombs, 79, Kenley Road, Merton Park, S.W.9, and F. B. Coombs, 22, The Parade, Epsom, Surrey.

H. Glynn Jones, Ltd.—Private company. Registered May 6th. Capital, £5,000. Objects: To carry on the business of manufacturers and factors of, dealers in, and agents for, radio, television, electrical, lighting and heating appliances, etc. Directors: H. G. Jones, 24, West Side, Wandsworth, S.W.18; and H. M. Joseph, 94, Ormonde Court, Upper Richmond Road, S.W.15. Registered office: 401, North End Road, Fulham, S.W.6.

Liquidations

Chronomatic (Time Control), Ltd.; Telephone Rentals (Lancashire), Ltd.; Telephone Rentals (Northern), Ltd.; New System Private Telephones, Ltd.; I.T.C., Ltd.; Telephone Rentals (Western), Ltd.; Telephone Rentals (South Wales), Ltd.; Telephone Rentals (Northern Ireland), Ltd.; Telephone Rentals (Yorkshire), Ltd.; Telephone Rentals (Notts & Yorks), Ltd.; Telephone Rentals (Stores Distribution), Ltd.; and Telephone Rentals (Midlands), Ltd.—Winding up voluntarily. Liquidator, Mr. C. T. Lane.

Vacuum Refrigeration, Ltd.—Winding up voluntarily. Joint liquidators, Messrs. R. H. A. Neuschild and A. Shelley, 49, Moorgate, London, E.C.2.

Bankruptcies

H. Tidswell (H. Tidswell & Co.), electrical engineer, 11, Bazaar Street, Pendleton, Salford.—Order made April 16th, 1946, granting discharge, subject to bankrupt's consenting to judgment being entered against him by the Official Receiver in the Salford County Court for the sum of £250 and £1 10s. costs of judgment. (This sum has been paid to the Official Receiver).

E. M. Swift, electrical engineer, 10, Joinings Bank, Langley Green, Worcestershire.—Public examination May 22nd at the Court House, Lombard Street West, West Bromwich.

C. F. A. Henckel, trading as Dawson & Henckel, electrical dealers, 42, Grays Inn Road, W.C.1.—Trustee, Mr. A. Cripwell, Balfour House, Finsbury Pavement, London, E.C.2, released April 29th.

H. K. Hawkins, electrical engineer, lately residing at 48, Beaufort Road, Edgbaston.—First and final dividend of 20s in the £ payable June 7th at the Official Receiver's Office, Somerset House, 37, Temple Street, Birmingham, 2.

STOCKS AND SHARES

THERE is more doing in the present time in Stock Exchange markets than there has been for the last twenty years. Members and staffs are overworked; clients complain because of the delay that inevitably occurs in the execution, the reporting and the completion of their bargains; price rise daily; only here and there is there any evidence of weakness. The latter has been, it is true, perceptible in British Government securities, owing to the unexpectedly generous terms offered by the Chancellor of the Exchequer to subscribers to the new 2½ per cent Savings Bonds. Scarcity of stock makes itself obvious mainly through the forcing up of quotations as the prospective buyers insist upon carrying out their wishes at what often seem to be high prices.

Gilt-Edged

In anticipating the new Government loan, the gilt-edged market had looked for distinctly less generous terms than proved to be the case when the Chancellor of the Exchequer announced his new 2½ per cent Savings Bonds. These have a medium-term life, being redeemable between 1964 and 1967, and are "on tap" at par. Previous issues on the same lines have generally had the effect of keying-up prices of gilt-edged stocks to new high levels. On this occasion, a reversal of the process produced an appreciable setback in the market as a whole.

Traction and Transport

British Electric Traction deferred stock advanced 30 points to 1135, on the announcement of a 10 per cent cash bonus—marking the company's jubilee year—in addition to the final dividend which again brings up the year's total to 45 per cent. On the dividend alone, the stock yields about 4 per cent, but the price is influenced by considerations of what the eventual position would be on the implementation of the Government plans to take over the electricity supply and transport services. The market in Home Railway stocks has developed activity at rising prices, partly on the view that fares and charges will have to be raised, sooner or later, to meet the increase in running expenses. Transport "C" is 2 points higher at 67 and Southern Railway 5 per cent preference at 117 is 2½ to the good.

Rising Prices

Associated Electrical Industries at 71s., English Electric at 68s., Johnson & Phillips at 90s. and Murex at 92s. are all a florin harder. General Electrics at 105s. 6d. have gained 11s. in less than two months. Ward & Goldstone rose 2s. 6d. to £2. Henley's put on a further 1s. 6d., advancing to 32s. 6d. De la Rue at 11 $\frac{5}{16}$ are 3s. 9d. up. Burco at 25s. are 1s. 6d. better. Crabtrees at 51s. 3d. and Reyrolles at 80s. show gains of 1s. 3d. Among other prices that have improved are Siemens 44s., Mather & Platt, 58s. 3d.; International Combustion, 8$\frac{1}{8}$, and Tube Investments, 6 $\frac{3}{16}$. Walsall Conduits recovered to 62s.

Other Movements

The hand of investment is discernible in the rises to 133 and 33½ in Anglo-American Telegraph preferred and deferred: a yield of 4½ per cent upon reasonable security holds temptation nowadays. Cable & Wireless stocks are quiet, and show no change, at 116½ for the preference and 103½ for the ordinary. Globe Telegraph ordinary are up 1s. at 43s. 6d. Anglo-Portuguese Telephones at 30s. 6d. have also gained a shilling. In the overseas groups, Calcutta Trams eased off to 62s. 6d., though Calcutta Electrics at 59s. are 1s. better on the week. Victoria Falls ordinary, persistently bought, are another 1s. 3d. higher at 5¾. The dollar stocks are mostly dull: Montreal Power receded to 22, Brazilian Tractions to 29$\frac{7}{8}$.

A Few Falls

What few falls have occurred include Vactric, down to 26s., Telephone Manufacturing, 3d. lower at 15s. 3d., Crompton Parkinsons, which rose to 37s. 6d. before reacting to 36s. 6d., and Enfield Cables, 5s. down at 62s. 6d. Automatic Telephones are 6d. easier at 76s. 3d. Where falls occur, the facile and popular explanation for them is that holders are selling in order to use the money for the purchase of mining shares spiced with speculation possibilities. And there may be something in that.

Radio Matters

To finance the general development of the business in home and export markets, the Pye Company is offering new 5s. deferred shares to holders of the existing stock in the proportion of one new share for every 30s. of stock held. With the present 5s. units at 40s., the rights to the issue are worth about 1s. per unit. Additional facilities for research are among the objects of the issue, which will bring in about £200,000 new money. Radio Rentals 5s. shares are firm and active at 37s. 6d. on the declaration of a 7½ per cent interim dividend. For the last three years the company has paid 5 per cent interim, followed by 15 per cent final dividends. On that basis the yield works out at under 2¾ per cent. Ultra Electrics, now 9s. 9d., have been a firm market since news of the capital issue.

Vickers

A substantial advance in the price of Vickers 10s. shares to 27s. 3d. was started by the publication of the consolidated accounts. These opened the eyes of investment to the impressive financial strength and earning capacity of the group as a whole. Subsequently the chairman's review at last week's meeting initiated further buying of the shares on his reference to the question of restoring the 10s. stock units to their original value of 20s.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

AKT.-GES. Brown, Boveri & Cie.—"Electric gas blast circuit breakers." 9695/44. February 18th, 1943. (576989.) "Gas-blast electric circuit breaker with a flowing extinguishing medium for interrupting the arc." 9696/44. June 28th, 1943. (576990.) "Arrangements for preventing false switching operations with lines provided with electric short-circuit protective devices." 12939/44. July 7th, 1943. (576998.)

American Bosch Corporation.—"Sealing high tension electric wires in insulator sockets." 16735/43. December 26th, 1942. (577106.)

Automatic Telephone & Electric Co., Ltd., P. N. Roseby and R. D. Haigh.—"Control of electric hotplates." 14234. July 26th, 1944. (577128.)

H. G. A. Berger.—"Arc welding electrode holder of tubular construction." 19043. November 16th, 1943. (577108.)

British Mechanical Productions, Ltd., and F. C. Fuke.—"Snap-action electric switches." 10416. May 30th, 1944. (577126.)

British Solenoids, Ltd., and S. J. Tyrrell.—"Thermionic valve holders." 14571. September 6th, 1943. (577105.)

British Thomson-Houston Co., Ltd.—"Washing machines." 7216/44. April 21st, 1943. (576981.) "Electrical contact elements." 8480/44. May 13th, 1943. (577091.)

L. F. Broadway.—"Electron-discharge devices employing hollow resonators." 515. January 14th, 1941. (577037.)

Brush Development Co.—"Piezo-electric unit and method of making same." 21428/43. August 8th, 1942. (577022.)

C. H. W. Clark, J. A. Sugden and Steatite & Porcelain Products, Ltd.—"Thermo-electric devices." 20052. December 1st, 1943. (577109.)

E. De W. Coleman.—"Electrical apparatus for chemical analysis." 20084. December 1st, 1943. (577043.)

Dorman & Smith, Ltd., T. Atherton and J. Lund.—"Electrical plugs." 417. January 10th, 1944. (577024.)

English Electric Co., Ltd., J. P. Chittenden and H. G. Yates.—"Turbines." Cognate applications 12167/41 and 3999/42. September 19th, 1941. (577017.)

General Electric Co., Ltd., and B. N. Clack.—"Thermionic cathodes for electric discharge devices." 3603. March 18th, 1942. (577070.)

General Electric Co., Ltd., V. J. Francis and E. Kettlewell.—"Combinations of h.p.m.v. electric devices with means for operating them." 5836. May 5th, 1941. (577100.)

General Electric Co., Ltd., V. J. Francis, E. H. Nelson and E. B. Power.—"Methods of and apparatus for operating h.p.m.v. lamps." 5072. March 29th, 1943. (577104.)

E. R. Goldfield and E. B. Graves.—"Cooled X-ray tube head." 2983. February 17th, 1944. (577081.)

L. B. S. Golds, Edmundsons Electricity Corporation, Ltd., and P. & B. Engineering Co., Ltd.—"Electric cut-out or protective apparatus suitable for polyphase circuits." 8688. May 8th, 1944. (577092.)

W. T. Henley's Telegraph Works Co., Ltd., and H. C. Hoban.—"Electric cartridge fuses." 9714. May 19th, 1944. (576992.)

W. T. Henley's Telegraph Works Co., Ltd., and J. F. Stone.—"Electric fuse distribution boxes." 21249. October 31st, 1944. (577030.)

D. Jackson and Pye, Ltd.—"Arrangements for mounting magnets used in conjunction with electron discharge devices." 5124. March 20th, 1944. (577085.)

O. Kriwaczek and L. Kaye.—"Electric heaters for water and other liquids." 3714. February 29th, 1944. (577118.)

Marconi's Wireless Telegraph Co., Ltd., and S. W. H. W. Falloon.—"Methods and apparatus for time conversion by means of cathode ray or like tubes." 27306. October 5th, 1939. (577068.)

Micafil, Ltd.—"Wire tensioning devices for use in coil winding machines." 9841/44. June 18th, 1943. (576994.)

Patelhold Patentverwertungs- & Elektro-Holding Akt.-Ges.—"Method and arrangement for synchonizing alternating voltages." 11291/43. July 11th, 1942. (577019.)

V. Planer and F. E. Planer.—"Method and device for the location of faults, depth determination and tracing of electrical conductors." 2378. February 9th, 1944. (577080.)

Revo Electric Co., Ltd., A. E. Felton, and A. Crawford.—"Operating mechanism for snap-action electric switches." 9630. May 19th, 1944. (576986.)

F. A. Ross.—"Electric fuses." 3351. February 23rd, 1944. (577048.)

Siemens Electric Lamps & Supplies, Ltd., and H. Austin.—"Fluorescent materials." 7582. April 24th, 1944. (577089.)

D. M. Smith and Metropolitan-Vickers Electrical Co., Ltd.—"Speed control systems." 11674. September 11th, 1941. (577014.)

Standard Telephones & Cables, Ltd.—"Selection controlling circuits." 6899/44. May 6th, 1943. (Addition to 573405.) (577088.)

Standard Telephones & Cables, Ltd., and J. H. Fremlin.—"High frequency electron discharge apparatus." 12517. August 2nd, 1940. (577005.)

Standard Telephones & Cables, Ltd., W. A. Atley and R. G. Baker.—"Optical measuring instruments and/or gauges." 10763. June 5th, 1944. (577026.)

Standard Telephones & Cables, Ltd., L. H. Walley, G. H. Barnes, and H. Skellern.—"X-ray apparatus." 18304. November 4th, 1943. (577107.)

A. Tustin, A. Mandl and Metropolitan-Vickers Electrical Co., Ltd.—"Dynamo-electric machines." 9767. July 31st, 1941. (577038.)

Amended Specification Published

552672. British Thomson-Houston Co., Ltd. High frequency apparatus.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Birmingham.—June 18th. Electric Supply Department. Distribution boards and 250-MVA switchgear. (See this issue.)

Brighton.—June 7th. Electricity Department. L.v. paper insulated mains cable. (See this issue.)

Burnley. — June 10th. Town Council. Electrical installations for 236 houses, Woodbine Estate. (See this issue.)

Chesterfield.—June 10th. Electricity Department. One 1,000-A 3-phase meter testing equipment. (See this issue.)

Ealing.—May 27th. Town Council. Electrical installation work for 238 houses. (May 10th.)

Manchester.—June 3rd. Electricity Committee. 3,000 heat-resisting globes for street lanterns. (May 17th.)

June 4th. Reflector street lanterns. (See this issue.)

New Mills.—May 31st. Electricity Department. Transformers. (May 10th.)

Reigate.—May 31st. Town Council. Wiring of 96 houses. (May 10th.)

Rugby.—June 1st. Electricity Department. Electric cookers, water heaters, immersion heaters, washboilers and kettles. (See this issue.)

Salford.—May 29th. Electricity Department. Electrical installations in 144 flats, Regent Road. (See this issue.)

Southend-on-Sea.—June 6th. Electricity Department. Transformers, switchgear and transformer kiosks. (May 17th.)

West Midlands.—June 14th. Joint Electricity Authority. Storage battery and charging equipment. (May 17th.)

Orders Placed

Bedford.—Electricity Committee. Accepted. Transformers for twelve months.—British Electric Transformer Co. Four kiosk substations (£2,908).—Crompton Parkinson.

Bradford.—Electricity Committee. Accepted. Oil-immersed reactor.—English Electric Co.

Cheshire. — County Health Committee. Accepted. Electrical work at Backford Hall (£664).—James McKenzie.

Islington.—L.C.C. Accepted. Wiring and fittings at Highbury County School (£1,199).—T. Clarke & Co.

Portland.—Electricity Committee. Accepted. Cables (£697).—Pirelli-General.

St. Pancras.—Contracts and Stores Committee. Accepted. Twelve 2·2 cu ft refrigerators (£370) and two 3·8 cu ft models (£512).—Electrolux. Two 10 cu ft industrial type refrigerators (£245).—Kelvinator. Twelve drawer model cookers (£209) and twelve pot shelf models (£192).—Jackson Electric Stove Co. One gross electric irons (£103) and 200 No. DC438 cookers with enclosed type hotplates (£2,467).—G.E.C. Seven vacuum cleaners (large models £25 10s. each and small models £16 1s. 11d.).—Hoover.

Recommended 1,000 yd 0·1 sq in. 3-core h.v. cable (£614).—Standard Telephones & Cables.

Torquay.—Electricity Committee. Accepted. Piling, foundation and superstructure work for boiler and turbine houses, etc., at power station (£130,140).—William Moss & Co.

Wallasey.—Electricity Committee. Accepted. Service boxes, etc. (£411).—B.I. Callender's Cables. Joint boxes (£423).—Pirelli-General. Cables (£243).—Britannic Electric Cable Co. Conduits (£467).—Albion Clay Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Amble.—Houses (48), Ivy Street; R. Carse & Son, builders.

Atherton.—Houses (30), for U.D.C. (£35,396); G. Moss & Sons, Ltd., builders, Back St. Helens Road, Leigh.

Belper. — Houses (30), Bargate Road (£34,393); J. Milward & Son, builders, Market Place.

Bradford.—Houses (382), Clayton estate; city architect.

Builth Wells.—Houses (40), Lion Field; T. F. Howells & Co., builders, 83, Bartlett Street, Caerphilly.

Burnley.—Houses (50), Eastern Avenue estate; borough engineer.

Burton-on-Trent.—Houses (63), Rolliston estate and other sites; borough engineer.

Canterbury. — Maternity accommodation, Kent and Canterbury Hospital (£9,000); city engineer.

Caterham.—Houses (48), Tillingdown Hill; B. Clifford, Ltd., 7, High Street, Croydon.

Cheshire.—School dining rooms and kitchens, Ellesmere Port and Frodsham; E. M. Parkes, county architect, The Castle, Chester.

Chorley.—Houses (61), Moor Road; Heaton & Dennis, Ltd., builders, Wigan.

Clutton.—Houses (80), Timsbury; Thomas & Morgan & Partners, architects, Pontypridd.

Coulsdon.—Houses (161), Tollers Lane (£183,323); Walker (Tooting), Ltd.

Dewsbury.—Houses (66), School Lane, and Lee estate (58); borough architect.

Driffield.—Houses (32), for R.D.C.; Fred Vaux, architect, Danesmoor Chambers, 31, Quay Road, Bridlington.

Dundee.—Houses (30), for the Corporation; city quantity surveyor, 21, City Square.

Eccles.—Houses (90), Alder Park (£96,493); W. Fearnley & Sons, Ltd., builders, Eccles New Road, Salford, 5.

Exeter.—Permanent houses (176), Wonford (£201,004); J. Mowlem & Co., Ltd., builders, 91, Ebury Bridge Road, London, S.W.1.

Freebridge.—Houses (82), for R.D.C.; H. Marsh, architect, 14, King Street, King's Lynn.

Frimley and Camberley.—Houses (32), including two blocks of four flats, Rorkes Drift site, Mytchett; A. L. Farman, council's architect, 42, Richmond Park Road, London, S.W.14.

Gateshead.—Factory, Team Valley, for Leyland Motors, Ltd.; Hadden & Hillman, builders, New Bridge Street, Newcastle-on-Tyne.

Helston.—Permanent houses (36), in the Porthleven and Sithney ward of the borough; G. Bazeley & Partners, Council's architects, 15-16, Alverton, Penzance.

Hereford.—Houses (140), Holme Lacy estate; C. E. T. Booth, borough architect.

Hexham, Northumberland.—Houses (200), for R.D.C.; W. Dixon & Sons, Collingwood Street, Newcastle-on-Tyne.

Hoylake.—Permanent houses (32), Black Horse Hill estate; B. F. Holden, engineer and surveyor, Town Hall.

Islington.—Houses (285), shops and laundry, Carlsbad site (£410,044) and 48 dwellings, Canonbury estate (£63,482); Davis Contractors, Ltd.

Kent.—Rebuilding Thanet Institution (£25,000), reinstatement, Malling Institution (£20,000), residential nursery, Orpington (£6,125), dispensary, Bromley (£4,000), staff accommodation, County Hospital, Farnborough (£27,723), extensions, nurses' home and kitchens, Chartham Mental Hospital (£28,410), extensions, County Mental Hospital, Maidstone (£36,700), workshops for technical institute, Barton Court site, Canterbury (£10,000), school of art, St. Peter's Lane, Canterbury (£7,200), and staff houses, Leybourne Grange Colony (£20,000); county architect, Maidstone.

Knutsford.—Houses (48), Heathfield Drive; H. Booth, builder, 138, Mobberley Road.

Letchworth.—Permanent houses (40), Icknield Way West; J. D. Rowland, clerk, Urban Council Offices.

Llwchwr.—Houses (68), for U.D.C.; E. A. Griffiths, clerk, Council Offices, West Street, Gorseinon.

Lossiemouth (Moray).—Development scheme, harbour and fish market (£200,000); harbour master.

Lyndhurst (Hants).—Houses (24), Marchwood; engineer, Council Offices.

Margate.—Houses (30), Park Lane, Birchington; borough engineer, 40, Grosvenor Place.

Matlock.—Houses (68), Cromford site (£75,936); Flintsons, Ltd., builders.

Newcastle-on-Tyne.—Flats (88), Wesley Street; city architect, 18, Cloth Market.

Houses (36), Hesleyside Drive; G. Bainbridge, builder.

Pembroke.—Houses (94), Ferry Road and Green Meadow (£129,853); Hadsphaltic Construction Co., Ltd., Albion Square, Pembroke Dock.

Stourbridge.—Houses (92), New Farm estate; G. N. Maynard, borough surveyor.

Stourport-on-Severn.—Houses (80), Walshes Farm; Pritchard, Godwin & Clist, architects, Bank Buildings, Kidderminster.

Sunbury-on-Thames.—Houses (69), three sites (£75,600); C. K. Davis, builder, Orchard estate, Shepperton.

Swaffham.—Houses (32), Watton Road; H. Marsh, architect, 14, King Street, King's Lynn,

Swansea.—Houses (76), Hanover Square Bonymaen; borough architect, Guildhall.

Factory and showroom, Gloucester Place; Talbot Plough Co.

Tamworth.—Permanent houses (40), Fazeley Road housing site; H. F. Bruce Smith, borough engineer and surveyor.

Teignmouth.—Houses (24), Coombe Valley estate; F. H. Clinch, surveyor, Bitton House.

Tottenham.—Houses (52), and 23 flats, Devon Road, 84 flats, Allington estate, and 30 flats, Cornwall Road; borough engineer.

Truro.—Houses (72), for R.D.C.; A. J. Cornelius, architect, 13, Lemon Street.

Wanstead and Woodford.—Flats (42), in six blocks, "The Roses," Salway Hill, Woodford Green; Tooley & Foster, Midland Bank Chambers, Buckhurst Hill, Essex.

Westhoughton. — Houses (62), Southfield Drive; Bradshaw, Gass & Hope, architects, 19, Silverwell Street, Bolton.

Whitchurch (Shropshire).—Permanent houses (52), Egerton Road housing site; McKewan, Fillmore & McKewan, Council's architects, 8, Newhall Street, Birmingham, 3.

Whitley Bay.—Houses (32), Seaton Sluice; U.D.C. surveyor, Council Offices.

Workington.—Houses (50), Salterbeck estate; borough engineer.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month from May 15th:—

EIMAC (design). No. 629,780, Class 9.—Radio valves.—Eitel-McCullough, Inc., San Bruno, California. Address for service: c/o Frank B. Dehn & Co., Kingsway House, 103, Kingsway, London, W.C.2.

IRL (design). No. 635,215, Class 9. Parts (not included in other classes) of electrical instruments and apparatus.—Imp Radio, Ltd., 76, New Cavendish Street, London, W.1.

DORLEC. No. 637,869, Class 9. Electrical instruments and apparatus not included in other classes.—Dorland Electrical Co., Ltd., 38, Brompton Road, London, S.W.3.

SUPERMEX. No. 638,486, Class 9. Insulated electric wire and cables.—W. T. Henley's Telegraph Works Co., Ltd., 51–53 Hatton Garden, London, E.C.1.

THINKER. No. 639,651, Class 9. Controls for air conditioning and ventilating apparatus.—Carrier Engineering Co., Ltd., Carrier House, Catherine Place, London, S.W.1.

J. H. RATCLIFFE'S (design). No. 639,367, Class 17. Insulating varnish.—J. M. Ratcliffe, Lilian M. Ratcliffe and Lilian I. Ratcliffe, trading as J. H. Ratcliffe & Co., 135A, Linaker Street, Southport.